Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-94-D-0888

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Record of Decision
for
Site 22
Former Building 105 Old Dry Cleaning Facility

Naval Station Great Lakes
Great Lakes, Illinois

Contract Task Order 0384

May 2008

NAVFAC Naval Facilities Engineering Command
Midwest
201 Decatur Avenue, Building 1A
Great Lakes, Illinois 60088

308580

TETRA TECH NUS, Inc.

Revision 0
May 2008

RECORD OF DECISION
FOR
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY

NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Midwest
201 Decatur Avenue, Building 1A
Great Lakes, Illinois 60088

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CONTRACT NUMBER N62467-94-D-0888
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ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of concern
cm/sec	Centimeter per second
cVOC	Chlorinated volatile organic compound
ERH	Electric Resistance Heating
FS	Feasibility Study
ft^2	Square feet
GRA	General Response Action
HDPE	High-density polyethylene
HHRA	Human health risk assessment
HI	Hazard Index
Illinois EPA	Illinois Environmental Protection Agency
ILCR	Incremental Lifetime Cancer Risk
K	Hydraulic conductivity
LUC	Land use control
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPW	Net present worth
OVA	Organic vapor analysis
PCE	Tetrachloroethene
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RAO	Remedial Action Objective
RI/RA	Remedial Investigation/ Risk Assessment
ROD	Record of Decision
TACO	Tiered Approach to Corrective Action Objectives
TBC	To be considered
TtNUS	Tetra Tech NUS, Inc.
µg/L	micrograms per liter
USEPA	US Environmental Protection Agency

1.0 DECLARATION

1.1 SITE NAME AND LOCATION

Site 22, the Former Building 105 Old Dry Cleaning Facility is located at the United States Naval Station Great Lakes in Lake County, Illinois. The site consists of contaminated soil and pore water that was identified during the investigation of a Resource Conservation and Recovery Act (RCRA) drum storage unit that was located inside the building.

The investigation, remediation, and closure of the site and the RCRA storage unit are being conducted following Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) guidance; this is due to the historical operations that occurred at the site and the extent of contamination at the site that is not associated with the RCRA storage unit. The closure of the RCRA storage unit will also comply with RCRA guidance.

The Navy is the lead agency for this site and the Illinois Environmental Protection Agency (Illinois EPA) is the support agency.

1.2 STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedy for contaminated soil and pore water remaining at Site 22, Former Building 105 Old Dry Cleaning Facility, located at Naval Station Great Lakes, Great Lakes, Illinois. The remedial action was selected in accordance with the CERCLA of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) 300]. This ROD was prepared in accordance with the United States Environmental Protection Agency (USEPA) decision document guidance (1999).

This decision is based on information contained in the Administrative Record[1] for the site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record has

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1 **Bold blue text** identifies detailed site information available in the Administrative Record and listed in the References section of the ROD. This ROD is also available on compact disc whereby **bold blue text** serves as a hyperlink to referenced information. The excerpts referenced by the hyperlinks are part of the ROD.

been considered and is relevant to the selection of the remedy at Site 22. Thus the ROD is based upon and relies upon the entire Administrative Record file in making the decision.

The Illinois EPA concurs with the selected remedy.

1.3 ASSESSMENT OF THE SITE

The response action selected in this ROD is necessary to protect the public health and the environment from actual or potential releases of hazardous substances to the environment or of pollutants or contaminants from this site that may present a risk to public health or welfare.

1.4 DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for Site 22 is a modification of Alternative 5, as described in the Feasibility Study (FS). Alternative 5 in the FS consisted of focused Electric Resistance Heating (ERH), limited excavation, off-base treatment (incineration) and disposal, capping, monitoring, and land use controls (LUCs). Tetra Tech NUS, Inc. (TtNUS) conducted the ERH treatability study from May through October 2006 at the site. Contaminant concentrations were reduced significantly, with approximately 1,200 pounds of chlorinated volatile organic compounds (cVOCs) removed from the soil and pore water within the treatment area. As a result of the ERH Treatability Study, the concentrations of cVOCs were reduced such that they no longer pose unacceptable risks to human health and the environment; therefore, no additional active CERCLA remedial action (limited excavation, off-base treatment, disposal, or monitoring) is necessary for Site 22 soil and pore water for protection of human health and the environment. Additionally, capping of the site is not required due to the presence of a high-density polyethylene liner and asphalt parking lot covering the site. However, LUCs are still required for Site 22 as described below. Therefore, the selected remedy for Site 22 is a modified version of Alternative 5, including the ERH Treatability Study (already completed) and LUCs.

The selected remedy was chosen based upon evaluation of site conditions, site-related risks, future land use, Applicable or Relevant and Appropriate Requirements (ARARs), and the Remedial Action Objectives (RAOs). The major component of the selected remedy for Site 22 is as follows:

- LUCs, including property, soil, and groundwater use restrictions, will be implemented at the site to prevent future residential development and restrict groundwater use and disturbance of soil. The LUCs will require review of future construction activities and intrusive work at the site to protect workers and to confirm proper management of contaminated materials. Site inspections will be

conducted to verify the integrity of the current asphalt cover and that site use remains unchanged. Annual site inspections will be conducted to verify continued implementation of these LUCs. The LUCs will be incorporated into the Base Master Plan to make sure that the restrictions on soil exposure and groundwater use established in the LUC Memorandum of Agreement (Naval Station Great Lakes, 2003b) are applied and enforceable at this site.

1.5 STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, is cost effective, and complies with federal and state requirements that are legally applicable or relevant and appropriate to remedial action. The nature of the selected remedy for Site 22 is such that ARARs will be complied with in substance. The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at this site and satisfies the preference for treatment as a principal element. Of those alternatives that are protective of human health and the environment and that comply with ARARs, the selected remedy meets the threshold criteria and provides the best balance of trade-offs in terms of the five balancing and modifying criteria. Because this remedy will result in contaminated soil and pore water with hazardous substances, pollutants, or contaminant concentrations remaining on-site exceeding levels that allow for unlimited use and unrestricted exposure, a statutory review (Five-Year Review) will be conducted by the Navy within five years of initiation of the remedial action to ensure that the remedy is protective of human health and the environment. Such a review will be conducted no less often than every five years thereafter to ensure that the remedy continues to provide adequate protection of human health and the environment. The site reviews will be prepared by the Navy and will consist of information obtained during the annual site inspections (Section 2.10.2.2) regarding the condition of the site with respect to the established LUCs. During the site inspections, it will be confirmed that site usage has not changed, proper signage is present, the asphalt and liner are in good repair, and exposure to contaminated media in the subsurface is being controlled. Recommendations for actions at the site, as appropriate, will also be included. If LUCs are shown to be insufficient, another remedial approach will be evaluated and may be implemented.

1.6 DATA CERTIFICATION CHECKLIST

The information required to be included in this ROD is summarized on Table 1-1 and presented in Section 2.0 of this ROD. Additional information about Site 22 can be found in the Administrative Record for Naval Station Great Lakes.

1.7 AUTHORIZING SIGNATURES

David A. Schnell — 8 Aug 08

D. A. Schnell, Captain, United States Navy
Commanding Officer, Naval Station Great Lakes
Date

Douglas P. Scott — 8/27/08

Douglas P. Scott, Director, Illinois EPA
Date

TABLE 1-1

DATA CERTIFICATION CHECKLIST
SITE 22 – FORMER BUIDLING 105, DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Information	ROD Reference
Chemicals of concern (COCs) and their concentrations	Section 2.5.3, pages 2-7 and 2-8, and Figures 2-3 and 2-6
Baseline risk represented by the COCs	Section 2.6, page 2-9, and Table 2-5
Cleanup goals established for the COCs	Section 2.7, page 2-10
Disposition of source materials constituting principal threat	Section 2.2, pages 2-1 through 2-3; Section 2.5.3, pages 2-7 and 2-8; Section 2.6, page 2-9
Current and reasonably anticipated future land use scenario used for risk assessment	Section 2.5.4, page 2-8
Potential land uses available at the site as a result of the selected remedy	Section 2.10.1, pages 2-16 and 2-17
Estimated capital, operating and maintenance (O&M), and net present worth (NPW) costs of selected remedy. Discount rate used and timeframe over which these costs are projected	Section 2.8.5, page 2-16, and Table 2-6
Key factors which lead to the selection of the remedy	Section 2.10.1, pages 2-16 and 2-17

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Naval Station Great Lakes is located in Lake County, Great Lakes, Illinois, along the shores of Lake Michigan, as shown on Figure 2-1. It is bounded on the north by the City of North Chicago, on the south by the Veterans Administration Hospital and Shore Acres Golf Course and Country Club, on the east by Lake Michigan, and on the west by US Route 41 (Skokie Highway). The majority of Naval Station Great Lakes activities occur on a plateau atop a steep bluff that rises 70 feet above the beach along Lake Michigan. Naval Station Great Lakes is used to support naval training and consists of the Recruit Training Command, the Training Support Center, and Naval Facilities Engineering Command Midwest.

Site 22, Former Building 105 Old Dry Cleaning Facility, is bounded on the south by Porter Avenue, on the west by a vacant asphalt-paved lot, on the north by Bronson Avenue, and on the east by Sampson Street, as shown on Figure 2-2. The former 10,500-square-foot building was a slab-on-grade structure measuring approximately 150 feet by 70 feet. Naval Station Great Lakes has operated with a RCRA interim status permit (USEPA # IL7170024577) since November 19, 1980. Building 105 was included in the RCRA Part A permit because of a drum storage unit (storage of hazardous waste consisting of spent tetrachloroethene [PCE] from the dry cleaning operation) that was located inside the building along the eastern wall (TtNUS, 2006). The facility's RCRA interim status permit is currently open.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.2.1 Site 22 History

Building 105 was constructed in 1939 and was utilized as a dry cleaning facility until 1993 or 1994 when it was converted to a vending machine supply and repair station. From 1993 or 1994 until February 2001, the building was used to warehouse and repair vending equipment and products. The vending machine supply and repair operations ceased in February 2001, and the building was vacant until it was demolished in March 2003.

The hazardous waste/materials associated with the laundry facilities were stored inside the building from 1980 until 1987. The quantity of waste stored at this unit is unknown; however, according to the revised RCRA permit, 165 gallons of hazardous waste/materials (three 55-gallon drums) was the maximum amount stored at one time in this area. The storage area consisted of the concrete floor (no berms or curbs were present) of the building adjoining the concrete block exterior wall. A garage-type entry door

and several floor drains were located near the storage area. Historical building foundation plans show that the floor drains were connected to the storm sewer system located outside of the building. No visual evidence of spillage (staining) was observed or reported in this area, and the floor was in good condition (two cracks and construction joints were observed) during a site visit associated with the **Remedial Investigation and Risk Assessment (RI/RA)** report (TtNUS, 2004).

The building foundation plans also show two 6-inch drains from the gutter under the washing machines associated with former laundry operations. These drains were connected to a grease catch basin located outside the southeastern corner of the building by a 6-inch cast iron pipe (see Figure 2-2). The grease catch basin was approximately 5 feet by 7.5 feet by 5.5 feet deep with two chambers and had a 6-inch tile effluent pipe. It is speculated that the effluent line from the grease catch basin was connected to a manhole located outside of the building along Sampson Street for the waste water (sanitary) lines for Naval Station Great Lakes. Soil and **pore water** contamination is assumed to be a result of the dry cleaning operations in the building.

2.2.2 Previous Investigations and Studies

Investigations at Site 22 included soil and pore water/groundwater sampling over a 10-year period. Tables 2-1, 2-2, and 2-3 are summaries of analytical results for **surface soil** and **subsurface soil** and **pore water** sampling, respectively, from the RI/RA report. According to these investigations, the **chemicals of concern (COCs)** at Site 22 are PCE and cis-1,2-dichloroethene in soil and pore water. The area of highest contamination (“hot spot”) is located near the southeastern corner of the building along Sampson Street near the former grease catch basin, as shown on Figure 2-3.

Based on the FS, a Focused ERH Treatability Study was performed by TtNUS using the soil results shown on Figure 2-3 as the baseline to define the area of treatment as shown on Figure 2-4. The Focused ERH Treatability Study began in May 2006. The goal of the treatability study was to reduce the average soil cVOC concentration to less than 20 milligrams per kilogram (mg/kg) for a reduction of 95.5 percent from the pre-ERH Treatability Study sample data. For this treatability study, the cVOCs concentration was defined as the sum of the concentrations of PCE, trichloroethene, cis-1,2-dichloroethene, and vinyl chloride.

Following the ERH Treatability Study, results from **15 sampling locations** indicated that the average concentration of CVOCs in soil was reduced by 99 percent, from a pre-ERH Treatability Study concentration of 445 mg/kg to 4 mg/kg. The post-ERH Treatability Study results are shown on Figure 2-5. Table 2-4 is a summary of post-ERH Treatability Study surface and subsurface soil analytical

results. During operation of the ERH system, an estimated 1,200 pounds of cVOCs were removed from the treatment area. Results from three pore water samples (shown on Figure 2-6) collected from monitoring wells in the area of highest soil contamination indicated that the pore water concentration was reduced by 99 percent during the ERH Treatability Study. Table 2-5 is a summary of post-ERH Treatability Study groundwater analytical results. For complete results of the Focused ERH Treatability Study, refer to the ERH Treatability Study Report (TtNUS, 2008a).

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Public notices of the availability of the **Proposed Plan for Site 22** were placed in the Great Lakes Bulletin. A 30-day comment period was held from March 7 through April 7, 2008. No public comments were received during the comment period (see Section 3.0).

Documents pertaining to Site 22 are available to the public in the Environmental Department at Naval Station Great Lakes, Building 1A, located on 201 Decatur Avenue, Great Lakes, Illinois. This ROD will become part of the Administrative Record File [NCP §300.825(a)(2)].

2.4 SCOPE AND ROLE OF ACTION

In 1986, an Initial Assessment Study conducted at Naval Station Great Lakes identified 14 potentially contaminated sites and concluded that seven of these sites warranted further investigation to assess potential long-term impacts. Although Site 22 was not included as one of these seven sites, investigations for closure of the Building 105 hazardous waste storage area by the RCRA program identified soil contamination that warranted further investigation. Investigations at Site 22 indicated the presence of soil and pore water contamination. To protect the public from current and potential future health risks, as well as to protect the environment, the following RAOs were developed in the Site 22 FS:

- Prevent unacceptable human health risks associated with inhalation, ingestion, and dermal contact with soil containing chlorinated organics at concentrations greater than established preliminary remediation goals (PRGs).

- Prevent unacceptable human health risks associated with ingestion of groundwater or future dermal contact by workers with groundwater containing chlorinated organics at concentrations greater than established PRGs.

- Prevent further adverse impacts on groundwater from chlorinated organics migrating from soil to groundwater. It should be noted that at the current time this exposure pathway is not applicable to Site 22 because the site is covered with an asphalt parking lot and it was demonstrated that the **exclusion to the groundwater ingestion pathway**, as provided in Subpart C of TACO, Part 742.320, applies at this site; to ensure the continued prohibition of groundwater use, the site will be entered in to the Naval Station Great Lakes LUC Memorandum of Agreement prohibiting the use of groundwater at the facility.

- Comply with the Naval Station Great Lakes RCRA permit issued by Illinois EPA, and obtain closure for the drum storage area (RCRA Unit SO1). This includes conducting remedial actions to reduce cVOC mass in soil and groundwater.

In meeting these RAOs, contaminated media may be left in place. The ERH Treatability Study has already achieved most of these RAOs.

2.5 SUMMARY OF SITE CHARACTERISTICS

2.5.1 Geology

The gently rolling topography of Lake County, Illinois is the result of glaciation. The most prominent topographic features are glacial moraines and unconsolidated glacial deposits that cover most of the study area. The terrain of Naval Station Great Lakes consists of relatively flat glacial drift deposits bordered by steep lake-facing bluffs with vertical sloping ravines. The unconsolidated glacial material that comprises the bluff faces and ravine walls is continually eroded.

The topography of Lake County creates poorly defined drainage patterns consisting of swales that enter depressions and marshes. Most of Naval Station Great Lakes is situated on a plateau elevated 640 to 660 feet above mean sea level (Site 22 is at approximately 650 feet above mean sea level). The Lake Michigan shoreline is approximately 580 feet above mean sea level.

Geologic conditions at Site 22 were characterized as part of the RI/RA (TtNUS, 2004). Surface and subsurface materials at Site 22 were visually classified based on macrocore and split-spoon samples collected during the drilling of soil and well borings conducted as part of the TtNUS field investigation. The shallow subsurface lithology of Site 22 was characterized to a depth of 50 feet.

Fill material consisting of gravel, sand, silt, cinders, and occasionally bricks is present over most of the site to thicknesses up to approximately 5 feet. Below the fill material layer is a heterogeneous mixture of sandy clays, gravelly clays, and silty clays with discontinuous silt and sand stringers to a depth of 30 feet below ground surface (bgs) that is considered the undisturbed, shallow subsurface lithology of Site 22. Laboratory sieve analysis of composite samples from these deposits indicates that the Unified Soil Classification System descriptions of these soils are ML (sandy silt) to CL (silty clay). Immediately below this is a fine- to coarse-grained sand layer that appears to be laterally extensive over much of the site. The thickness of this sand layer varies slightly, ranging from approximately 7 to 10 feet. Immediately below this sand layer are clays and silty clays.

2.5.2 Hydrogeology

Two separate aquifers are present at Site 22, a shallow (water table) and a deep confined aquifer. The shallow aquifer ranges from 4 to 30 feet bgs and is composed primarily of unconsolidated clays, silts, and silty clays, with discontinuous sand and gravel lenses interspersed throughout. In general, the water table within the heterogeneous soil is shallow and is typically encountered at a depth of 4 to 18 feet bgs at the site. Groundwater is expected to migrate horizontally in the more permeable materials within the silts and clays.

The deep aquifer ranges from 30 to 40 feet bgs and is composed of fine to coarse sand. In many sections of the site, clays and silty clays directly overlie and underlie this sandy layer. It is not known whether the deep aquifer is continuous across the site. However, based on the geologic setting and lithologies encountered, it is considered likely that this deep aquifer does exist throughout the site area. Groundwater in this aquifer is confined and exhibits a reasonably strong, upward gradient. Static groundwater levels in wells completed in the deep aquifer ranged from 5 to 8 feet bgs and varied only slightly across the site (less than 0.1 foot of head change between the monitoring wells).

Recharge to the shallow aquifer at the site is minimal because of the presence of the high density polyethylene (HDPE) membrane and asphalt parking lot installed where Building 105 once stood. This membrane covers 80 percent of the site and the asphalt parking lot covers more than 95 percent of the site, preventing precipitation from migrating downward through the soil. The site is also surrounded by roads, parking surfaces, and buildings with very little open space. Consequently, recharge via precipitation and transport through the shallow aquifer to the deep aquifer is minimized. Historically (before the installation of the HDPE liner), precipitation infiltration was limited because of Building 105 itself and the surrounding asphalt parking lot.

The groundwater flow pattern for the shallow aquifer is fairly complicated. The horizontal groundwater gradient is very similar across most of the site, although the direction varies widely. Groundwater flow in the shallow aquifer is to the west, east, and south. From a very general perspective considering the four monitoring wells located around the perimeter of the site (NTC22MW01S, NTC22MW02S, NTC22MW07S, and NTC22MW08S as shown of Figure 2-3), groundwater migrates southwest in the general direction of Pettibone Creek; however, the overall groundwater path is much more complicated. Groundwater elevation lows are observed near the former southwestern corner of Building 105 at NTC22MW04S, the former southeastern corner of the building at NTC22MW06S, and near the southeastern edge of the site at NTC22MW09S. Though the latter two locations are near utility conduits, there is no evidence from the boring logs that suggest the low elevations are anomalies due to drainage along these conduits.

Horizontal hydraulic conductivity (K) values for the shallow aquifer ranged from 0.00248 foot per day [8.75×10^{-7} centimeter per second (cm/sec)] to 3.53 feet per day (1.25×10^{-3} cm/sec). The geometric mean horizontal K value for the six shallow aquifer monitoring wells was calculated to be 0.186 foot per day (6.54×10^{-5} cm/sec). These values are within the typical range for silty clays and clayey sands (Fetter, 1980 and Freeze and Cherry, 1979). In the deep aquifer, horizontal K values ranged from 0.5 foot per day (1.76×10^{-4} cm/sec) to 150 feet per day (5.29×10^{-2} cm/sec). The geometric mean horizontal K for these deep aquifer monitoring wells was calculated to be 15.5 feet per day (5.45×10^{-3} cm/sec). These values are within the typical range for fine to coarse sands (Fetter, 1980 and Freeze and Cherry, 1979).

The horizontal hydraulic gradient for the shallow aquifer ranged from 0.0320 to 0.0425. Using an average porosity of 0.35 for gravelly clay/silty clay (Freeze and Cherry, 1979) and the site-wide geometric mean K value for the shallow monitoring wells (0.186 foot per day), the groundwater velocity was approximated. The calculated groundwater migration rates range from 0.01699 feet per day (6.21 feet per year) to 0.0226 feet per day (8.25 feet per year). This range of groundwater velocities is generally consistent with the lithologies present at the site.

Care must be taken when interpreting these results because, based on the lithologies present, horizontal groundwater flow only occurs in the continuous sand and gravel lenses. There is no evidence from the boring logs that these lenses are laterally extensive where contamination has been found. Therefore, large-scale, site-wide transport (and off-site transport) of potential contaminants in the shallow aquifer is not likely to be occurring. Furthermore, based on the direction of groundwater flow, most of the groundwater remains on site.

Based on the low permeability, lack of large-scale site-wide transport, and the fact that the majority of the water remains on site, the water present in the subsurface is considered "pore water" throughout this ROD. In this case, the term pore water indicates that the water is not associated with a larger, continuous, site-wide groundwater system.

2.5.3 Nature and Extent of Contamination

The following briefly summarizes the **nature and extent of the contamination in surface soil, subsurface soil, and pore water at Site 22 as identified during the TtNUS remedial investigation**:

- The primary source of soil and pore water contamination appears to be the former dry cleaning operation and associated drains and grease catch basin in the southeastern portion of the former building.

- cVOCs are significant site-specific contaminants at Site 22. PCE and its degradation products (e.g. trichloroethene, cis-1,2-dichloroethere, and vinyl chloride) were detected in surface and subsurface soil at high concentrations in the vicinity of former Building 105, with the highest concentrations detected near the former drains and grease catch basin. In addition, PCE and its degradation products were detected in pore water at the same locations.

- PCE and its degradation products were detected in surface and subsurface soil at concentrations exceeding screening levels for groundwater protection. Some of the cVOC concentrations reported for soil in the southeastern corner of the site also exceed the Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) for human exposure (i.e., incidental ingestion, inhalation). Illinois EPA has classified the contaminated media (soil and pore water) as a listed hazardous waste for PCE (F002).

- Impacted soil and pore water around the former drains and grease catch basin are limited to shallow depths (to 25 feet), with the highest concentrations being between 8 to 20 feet bgs. Impacts to the deeper aquifer zone are limited both in concentration and migration potential due to the geology of the site.

- There does not appear to be a groundwater plume present at the site. Impacts to the pore water are limited to areas immediately surrounding the former drains and grease catch basin area.

Based on the RI/RA and the FS, the Navy conducted a Focused ERH Treatability Study in the area of greatest soil contamination. The Treatability Study was conducted to remove contamination from the site soil and pore water and reduce risk to human health and the environment; the goal of the study was to reduce the average cVOC concentration in the soil to less than 20 mg/kg. The following briefly summarizes the ERH Treatability Study and the **nature and extent of the contamination in surface and subsurface soil and pore water at Site 22 after the operation of the ERH Treatability Study**:

- The Focused ERH Treatability Study system was installed in the area of greatest soil contamination (approximately 2,400 square feet) and incorporated the areas with soil concentrations exceeding the Illinois EPA criteria that required excavation in the FS. The Focused ERH Treatability Study system consisted of 16 electrodes installed to depths ranging from 8 to 25 feet bgs. Based on this design, the ERH Treatability Study addressed approximately 1,400 cubic yards of soil.

- The Focused ERH Treatability Study system was operated from May through October 2006 and approximately 1,200 pounds of cVOCs were removed from the treatment area through the vapor recovery system.

- Fifteen soil samples and three pore water samples were collected before and after the operation of the Focused ERH Treatability Study system to provide data to evaluate of the effectiveness of ERH in reducing cVOC concentrations at the site.

- Based on the results from the 15 soil samples, the average cVOC concentration was reduced from 445 mg/kg prior to the Focused ERH Treatability Study to 4 mg/kg at the end of the Focused ERH Treatability Study (99 percent removal). Total cVOC concentrations in individual samples at the end of the Focused ERH Treatability Study ranged from non-detect to 15.4 mg/kg.

- Based on results from the three pore water samples collected in the area of highest contamination, PCE concentrations were reduced by 99 percent after the Focused ERH Treatability Study. Pore water cVOC concentrations in the most contaminated well (NTC22MW06S) were reduced from 45,000 micrograms per liter (µg/L) to 16 µg/L. The post-ERH Treatability Study concentrations slightly exceed USEPA Maximum Contaminant Levels and Illinois EPA criteria.

2.5.4 Current and Potential Future Site Uses

The site is currently a parking lot used by personnel that conduct activities in this area at the fire station (Building 106), post office (Building 112), laundry/tailor services (Building 220), gymnasium (Building 4),

security administration (Building 6), staff barracks (Building 178), and medical and dental clinic (Building 237). Future use of the site is not expected to change according to the Regional Shore Infrastructure Plan Naval Station Great Lakes (2003a). In addition, Naval Station Great Lakes Instruction 11130.1 provides restrictions to the use of groundwater to all geographical areas of the facility. The restriction includes the installation of groundwater wells and the use of groundwater and surface water runoff.

2.6 SUMMARY OF SITE RISKS

2.6.1 Human Health Risk Assessment

The RI/RA investigation of Site 22 included evaluating potential human health risks from chemicals in soil and pore water prior to the Focused ERH Treatability Study. The **human health risk assessment (HHRA)** conducted with the data from the Site 22 RI/RA indicated that exposure to cVOCs in soil and pore water could pose potential risks to human health under current and potential future land use scenarios. In the ERH Treatability Study Report, it was demonstrated that the exclusion to the groundwater ingestion pathway, as provided in Subpart C of TACO, Part 742.320, applies at this site. Therefore, groundwater ingestion was not considered as an exposure pathway in the HHRA. These results are summarized on Table 2-6. The Incremental Lifetime Cancer Risks (ILCRs) for construction workers, future occupational workers, and maintenance workers are within USEPA's risk management range, $1x10^{-4}$ to $1x10^{-6}$, but exceeded the Illinois EPA goal of $1x10^{-6}$. ILCRs for future military adult residents, future military child residents, and future civilian residents exceeded USEPA's risk management range and the Illinois EPA goal. In addition, noncarcinogenic effects [represented by Hazard Indices (HI)] for construction workers, hypothetical future military and civilian residents exceeded the USEPA and Illinois EPA benchmark (1.0). The elevated carcinogenic and noncarcinogenic risks were mainly due to exposure to PCE in soil and pore water.

The HHRA conducted with the data collected after the Focused ERH Treatability Study are summarized on Table 2-6 and indicated that the estimated cancer risks for construction workers and future occupational workers are less than the USEPA's target risk range and the Illinois EPA goal of $1x10^{-6}$. Cancer risks for hypothetical future residents are within the USEPA target risk range and slightly exceed the Illinois EPA goal. Noncarcinogenic HIs for the receptors are less than the USEPA and Illinois EPA goal of 1. The cancer and noncarcinogenic risks calculated using the concentrations observed after the ERH Treatability Study are one to two orders of magnitude less than the estimated risks based on the RI/RA (pre-Treatability Study) data.

2.6.2 Ecological Risk Assessment

Site 22 provides no real terrestrial habitat, with only a strip of grass south of the site boundary in a highly developed portion of Naval Station Great Lakes. Although a few ecological receptors may be present at the site, they will not be exposed to site contaminants; therefore, ecological risks are negligible and an **ecological risk assessment** was not conducted at Site 22.

2.7 REMEDIAL GOALS

A remedial goal is the target concentration to which a COC must be reduced within a particular medium of concern to achieve one or more of the established RAOs. Remedial goals are developed to make sure that contaminant concentration levels left on site are protective of human receptors (based on future residential and industrial land use) and ecological receptors, when combined with appropriate LUCs. For Site 22, soil and pore water remedial goals were established based on the following criteria:

- Protecting human receptors from adverse health effects
- Protecting the environment from detrimental impacts from site-related contamination
- Compliance with federal and state ARARs

Soil PRGs were determined for the COCs based on the protection of human health from exposure to contaminants in soil via direct exposure (dermal contact, ingestion, and inhalation), indirect exposure to vapors emitted from surface soil, and chemicals migrating from soil to groundwater.

Groundwater PRGs were determined for the COCs based on the protection of human health for dermal contact (construction worker only) and inhalation of vapors migrating from groundwater into future buildings. As stated earlier, the groundwater ingestion pathway was excluded from consideration.

The cleanup goal for Site 22 was to reduce the average cVOC concentration of soil in the treatment area to less than 20 mg/kg (a reduction of 95.5 percent from the pre-remediation sample data), the Illinois EPA TACO criteria for industrial-commercial land use based on an inhalation exposure route for soil. It was anticipated that if the cleanup goal for soil samples was achieved, pore water concentrations at the site would decrease significantly as well.

2.8 DESCRIPTION OF REMEDIAL ALTERNATIVES

This section provides a narrative of each alternative evaluated for the remediation of soil and pore water at Site 22. For further information on the remedial alternatives, refer to the FS for Site 22 (TtNUS, 2006)

and the Proposed Plan (TtNUS, 2008b). The remedy selected in this ROD is presented in Section 2.10. As part of the FS, **each of the following alternatives was evaluated against the nine criteria**, as required by the NCP.

Section 2.0 of the FS presents **a complete list of ARARs**. The **ARARs presented in Section 2.11 of this ROD** are specific to the selected remedy.

To address the groundwater and soil impact at Site 22, preliminary screening of **General Response Actions (GRAs)** was completed, as detailed in the FS. Five remedial approaches were retained following this preliminary screening.

The five remedial alternatives evaluated for Site 22 in the FS are summarized below. This ROD documents the selection of a modified version of Alternative 5: Focused ERH, Limited Excavation, Off-Base Treatment (Incineration) and Disposal, Capping, Monitoring, and LUCs. A Focused ERH Treatability Study conducted from May to October 2006 reduced cVOC concentrations in soil and in pore water by 99 percent. Soil and pore water contamination that posed unacceptable human health risk is no longer present at the site. Therefore, only LUCs to prevent access to the remaining soil contamination at the site, maintain the existing cap (asphalt parking lot and HDPE liner), and prevent groundwater ingestion are necessary. The limited excavation, off-base treatment (incineration) and disposal, capping, and monitoring components of this alternative are no longer required.

2.8.1 Alternative 1: No Action

The No Action alternative maintains the site as is. This alternative does not address soil or pore water contamination and is only retained to provide a baseline for comparison to other alternatives (required under CERCLA). There would be no reduction in toxicity, mobility, or volume of COCs other than what might result from natural processes such as dispersion, dilution, biodegradation, and other attenuating factors. This alternative cannot be chosen if waste remains on site.

This alternative would not provide protection of human health and the environment. Under the current land use scenario, the potential for unacceptable risks to human health would remain. This alternative would not achieve the RAOs or comply with ARARs. There would be no reduction of contaminant mobility, and reduction in toxicity and volume would occur only through long-term natural attenuation and would not be monitored. Because no remedial action would take place, this alternative would not result in any short-term risks and would be very easy to implement. There would be no costs associated with the No Action alternative.

2.8.2 Alternative 2: In-Situ Chemical Oxidation, Monitoring, and LUCs

Alternative 2 would consist of three major components: (1) in-situ chemical oxidation, (2) monitoring, and (3) LUCs.

In-situ chemical oxidation would consist of injecting into the contaminated soil and pore water area [approximately 25,000 square feet (ft^2)] a special reagent formulated to chemically oxidize and degrade the soil COCs, in particular PCE. Injection would be conducted by using direct push technology. Approximately 660 direct push technology injection feed points ranging from 12 to 25 feet bgs and a minimum of two injection events would be required to achieve the PRGs.

Monitoring would consist of verifying the effectiveness and completeness of the in-situ chemical oxidation process following each injection event. Monitoring would consist of advancing soil borings throughout the contaminated area and field testing the samples collected at various depths using organic vapor analysis (OVA). For each boring, the soil sample with the highest OVA reading would also be analyzed for cVOCs by a fixed-base laboratory. Monitoring would also include collection of groundwater samples from existing monitoring wells and analysis for cVOCs by a fixed-based laboratory.

LUCs would be incorporated into the Base Master Plan and the Naval Station Great Lakes LUC Memorandum of Agreement to make sure that the restrictions on property use, groundwater use, and disturbance of soil established in the LUC Memorandum of Agreement (Naval Station Great Lakes, 2003b) are applied and enforceable at this site. These LUCs would be required until monitoring verifies the effectiveness and completeness of the in-situ chemical oxidation process in meeting the RAOs for the site. Additionally, LUCs would require review of construction activities and intrusive work in the area to protect workers and confirm proper management of contaminated materials.

This alternative would be protective of human health and the environment by destroying the soil COCs that could result in unacceptable risks to human receptors from exposure to contaminated soil. Although no significant groundwater contamination has been identified at Site 22, other than that of the pore water associated with the contaminated soil, in-situ chemical oxidation would also be protective of human health and the environment by removing the source of any potential future groundwater contamination.

This alternative would comply with chemical-, location-, and action-specific ARARs and to be considered (TBC) criteria, and it would provide long-term effectiveness and permanence. In-situ chemical oxidation is a well-proven technology for the permanent and irreversible destruction of the cVOCs that are the

COCs at Site 22. The site-specific effectiveness of this technology would also be verified through pilot-scale testing. Alternative 2 would reduce the toxicity, mobility, and volume of COCs through chemical degradation. This alternative would permanently and irreversibly remove (and/or destroy) an estimated 1,700 pounds of cVOCs from Site 22 soil. The use of direct push technology for the injection would create short-term risks; however, these risks would be minimized by appropriate protective equipment and engineering controls. The activities for this alternative may be difficult to implement because delivery of the chemical oxidation reagent in the tightly packed, low permeability soil at Site 22 would be difficult. **Both the capital cost and net present worth (NPW) cost would be $1,326,000.**

2.8.3 Alternative 3: In-Situ ERH, Monitoring, and LUCs

Alternative 3 would consist of three major components: (1) in-situ ERH, (2) monitoring, and (3) LUCs. In-situ ERH would consist of installing and operating an in-situ ERH system in the contaminated soil and pore water area (approximately 25,000 ft^2). This system would consist of a network of buried electrodes (approximately 75) connected to a power control unit. These electrodes would heat the contaminated soil and associated pore water to approximately 90 degrees Centigrade, resulting in the evaporation of cVOCs. The vapors would be collected in the recovery wells associated with each electrode and conveyed to a central treatment unit by a vacuum pump. The central vapor treatment unit would consist of a condenser to cool and separate water vapors and a vapor-phase granular activated carbon adsorption unit for the removal of cVOCs prior to exhaust to the atmosphere.

Monitoring to verify the effectiveness and completeness of the in-situ ERH process would be very similar to the monitoring described in Alternative 2. Monitoring would consist of advancing soil borings throughout the contaminated area and field testing the samples collected at various depths using OVA. For each boring, the soil sample with the highest OVA reading would also be analyzed for cVOCs by a fixed-base laboratory. Monitoring would also include collection of groundwater samples from existing monitoring wells and analysis for cVOCs by a fixed-based laboratory.

LUCs would be very similar to the LUCs described in Alternative 2.

This alternative would be protective of human health and the environment by removing COCs that could result in unacceptable risks to human receptors. This alternative would comply with chemical-, location-, and action-specific ARARs and TBC criteria, and it would provide long-term effectiveness and permanence. In-situ ERH is a well-proven technology for the permanent and irreversible removal of the cVOCs that are the soil COCs at Site 22. The site-specific effectiveness of this technology would also be verified through pilot-scale testing. Alternative 3 would reduce the toxicity, mobility and volume of COCs

through evaporation and granular activated carbon adsorption. This alternative would permanently and irreversibly remove an estimated 1,700 pounds of cVOCs from Site 22 soil. Similar to Alternative 2, the installation of the electrodes and system operation would create short-term risks; however, these risks would be minimized by appropriate protective equipment and engineering controls. The activities for this alternative would be readily implementable. **Both the capital cost and the NPW cost for this alternative would be $3,078,000.**

2.8.4 Alternative 4: Excavation, Off-Base Treatment (Chemical Oxidation or Incineration) and Disposal, Monitoring, and LUCs

Alternative 4 would consist of four major components: (1) excavation of soil and pore water, (2) off-base disposal of excavated material preceded, if necessary, by treatment with chemical oxidation or incineration, (3) monitoring, and (4) LUCs.

Soil and pore water contaminated with concentrations of COCs in excess of PRGs would be excavated. Approximately 10,000 cubic yards of contaminated material weighing an estimated 13,500 tons would be excavated to a depth of 25 feet bgs. The surface area of the excavation would be 13,750 ft^2 at ground surface, 12,100 ft^2 at 12 feet bgs, 7,500 ft^2 at 18 feet bgs, and 2,500 ft^2 at 25 feet bgs. Because of the significant depth and utilities in the area of the excavation, shoring of the excavation walls and utilities would be required. Also, because excavation would take place well below the level of the perched groundwater table that typically occurs at approximately 6 feet bgs, dewatering would be required by pumping in the periphery of the excavation area to depress the level of the perched groundwater table.

Following excavation, soil samples would be collected from the bottom of the excavated area and analyzed for cVOCs to verify that the PRGs have been met. Following verification sampling, the excavated areas would be backfilled with imported clean fill and regraded to achieve desired surface elevations. The excavated material would be transported to a permitted off-base treatment, storage, and disposal facility where, depending on the concentrations of COCs, it would be either directly landfilled or pre-treated with chemical oxidation or incineration and subsequently landfilled.

Monitoring would consist of collecting groundwater samples from existing monitoring wells surrounding the excavation area to verify that excavation activities had not resulted in migration of COCs to the surrounding groundwater. LUCs would be very similar to the LUCs described in Alternative 2.

This alternative would be protective of human health and the environment. Excavation of soil and pore water with concentrations of COCs greater than PRGs would remove the threat of unacceptable risk from

exposure of human receptors. This alternative would comply with chemical-, location-, and action-specific ARARs and TBC criteria, and it would provide long-term effectiveness and permanence. Alternative 4 would reduce the toxicity, mobility, and volume of the majority of the Site 22 COCs through pre-treatment with chemical oxidation or incineration. Approximately 1,700 pounds of cVOCs would be permanently and irreversibly destroyed. Similar to Alternatives 2 and 3, the excavation and disposal of the contaminated soil would create short-term risks to the construction workers and communities that the trucks travel through; however, these risks would be minimized by appropriate protective equipment and engineering controls. The activities for this alternative would be readily implementable, and **both the capital and 30-Year NPW costs for this alternative would be $9,340,000**.

2.8.5 Alternative 5: Focused ERH, Limited Excavation, Off-Base Treatment (Incineration) and Disposal, Capping, Monitoring, and LUCs

Alternative 5 would consist of five major components: (1) focused in-situ ERH; (2) limited excavation; (3) off-base treatment (incineration) and disposal; (4) monitoring; and (5) LUCs.

The focused in-situ ERH would consist of installing and operating an in-situ ERH system in the area of greatest soil and pore water contamination. This includes an area of approximately 1,400 square feet extending from the location of soil boring NTC22SB19 to approximately the location of monitoring well NTC22MW05S. The treatment scenario is similar to Alternative 3, although over a substantially smaller area. Soil with COC concentrations greater than the remedial goals that is not treated via ERH would be excavated. It is estimated that up to three separate locations may require excavation. These areas center on sample locations GL95-105S-8, GL95-105S-13, and NTC22MW05S. The necessity of excavation in these areas would be assessed based on results from soil samples collected from the locations prior to remedial action. The excavated material would be transported to a permitted off-base facility where, depending on the concentrations of COCs, it would be pre-treated with chemical oxidation or incineration and subsequently landfilled. The asphalt cover and HDPE liner currently present at the site would be left in place. Damage to these components during investigation and remediation would be repaired as necessary to maintain the integrity of the cap. The cap would be regularly inspected and maintained as necessary to ensure its continued integrity.

Soil samples would be collected following completion of the ERH and the limited excavation field activities. The samples would be utilized to demonstrate the reductions in cVOC concentrations in soil. Additionally, pore water samples would be collected following treatment to demonstrate the reductions in pore water concentrations as a result of ERH and to monitor for rebound in groundwater concentrations.

Appropriate LUCs would be implemented at the site. Based on the LUCs for Buildings 415 and 912 at Naval Station Great Lakes, the LUCs would include property, soil, and groundwater/pore water use restrictions, and maintenance of the existing parking lot. The site will be utilized in an industrial/commercial scenario, such as the current parking lot. The LUCs would specify that prior to any other site use, the human health risks would be recalculated and re-evaluated based on the potential future use.

Also, the LUCs would prohibit the installation of groundwater wells, other than for use as environmental monitoring wells. LUCs would be implemented to make sure that the restrictions on groundwater use established in the LUC Memorandum of Agreement are applied and enforceable at this site. Additionally, LUCs would require review of construction activities and intrusive work in the area to protect workers and confirm proper management of contaminated materials.

This alternative would be protective of human health and the environment. Focused in-situ ERH would be protective of human health and the environment by removing the COCs that could result in unacceptable risks to human receptors from the areas of greatest contamination, and excavation would be protective of human health and the environment by removing COCs mass from the site and preventing contact with site soil. This alternative would comply with chemical-, location-, and action-specific ARARs and TBC criteria, and it would provide long-term effectiveness and permanence. Alternative 5 would reduce the toxicity, mobility, or volume of COCs through evaporation, granular activated carbon adsorption, soil removal, and capping. Approximately 1,200 pounds of cVOCs would be removed by ERH and 150 pounds of cVOCs would be removed by excavation, off-base treatment, and landfilling. Similar to Alternative 3, the installation of the electrodes and system operation would create short-term risks; however, these risks would be minimized by appropriate protective equipment and engineering controls. The activities for this alternative would be readily implementable, and **both the capital and 30-Year NPW costs for this alternative would be $990,000**.

2.9 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Each of the remedial alternatives presented in Section 2.8 was **evaluated with respect to the nine criteria** outlined in Section 300.430(e) of the NCP and described in Section 4.1 of the Site 22 FS (TtNUS, 2006). A detailed analysis was performed for each alternative using the nine criteria to select a site remedy. Table 2-7 summarizes the comparison of these analyses; this table was modified from the FS, using the modified version of Alternative 5, as described in Section 2.10.2.

2.10 SELECTED REMEDY

2.10.1 Summary of Rationale for Remedy Selection

The goals of the selected remedy are to protect human health and the environment by eliminating, reducing, or controlling hazards posed by the site and to meet ARARs. Based on consideration of the requirements of CERCLA, the NCP, detailed analysis of alternatives, results of the treatability study, and comments received from the Illinois EPA, a modified version of Alternative 5, was selected to address the soil and pore water contamination at Site 22. With the implementation of this alternative, the site will be protective of human health and the environment.

The remedy was selected for the following reasons:

- The evaluation of alternatives conducted for Site 22 was consistent with the requirements of Section 121 of CERCLA and the NCP. Based on the information available, the selected alternative represents the best balance among the criteria used to evaluate remedies. The selected alternative attains federal and state ARARs and reduces the mobility, toxicity, and volume of contaminated soil and pore water on site. The alternative can be implemented, will be protective of human health and the environment, is cost effective, and will result in a permanent solution to the maximum extent practicable.

- COC concentrations remaining in soil following the Focused ERH Treatability Study do not present an unacceptable threat to human health or the environment.

- The selected remedy will meet the RAOs and remedial goals and will comply with location-specific and action-specific ARARs and chemical-specific ARARs and TBC criteria.

- Although concentrations of cVOCs exceed Illinois EPA TACO criteria in soil (residential) and pore water at Site 22, detected concentrations of these COCs do not present an unacceptable threat to human health or the environment under the current and foreseeable future site use scenarios.

- The selected remedy achieved risk reduction through active treatment and by imposing restrictions on access to contaminated soil and pore water.

2.10.2 Remedy Description

The remedy, a modified version of Alternative 5, is illustrated in Figure 2-7 and consists of two major components: (1) focused in-situ ERH that was implemented with the ERH Treatability Study; and (2) LUCs.

2.10.2.1 Component 1: Focused In-Situ ERH

The objective of this component was achieved during the **Focused ERH Treatability Study**. This component consisted of installing and operating an in-situ ERH system in the area of greatest soil contamination. This area was expanded from the estimated 1,400 square feet identified in the FS Report to 2,400 square feet to incorporate areas with soil concentrations exceeding the Illinois EPA criteria that required excavation in the FS; therefore, the limited excavation and off-base treatment and disposal components of Alternative 5 are no longer required. The Focused ERH Treatability Study system consisted of 16 electrodes installed to depths ranging from 8 to 25 feet bgs (Figure 2-4). A process flow diagram for a typical in-situ ERH system is provided on Figure 2-8.

Four electrodes and one temperature monitoring point were installed to a depth of 9 feet bgs on the western side of the site, designated as Area 3. The central portion of the site was designated as Area 2, and nine electrodes and one temperature monitoring point were installed to 18 feet bgs in that area. Treatment in the northeastern area of the site, Area 1, extended the deepest, with three electrodes and one temperature monitoring point installed to 26 feet bgs.

Construction of the ERH treatability study system began on April 17, 2006, and the system was completed and ready for operational testing May 8, 2006. The installation was approved for operation and energized on May 22, 2006, and system start-up began. Except for brief periods of shut down for soil sampling and maintenance, the ERH treatability study system operated continuously through October 4, 2006; operation of the vapor recovery system continued through October 16, 2006, to recover additional vapor created in the heated soil. Energy input was adjusted throughout the system operation based on vapor recovery and soil sampling data to optimize system performance. The amount of energy utilized was 632,866 kilowatt-hours over 19 weeks of operation.

Numerous soil sampling rounds were performed to evaluate the performance of the treatability study. Soil sampling was conducted during system operation to measure the amount of remaining contamination in the treatment area and to guide operational changes intended to optimize remediation efforts towards

the most impacted portions of the site. This included a baseline sampling event and four performance sampling rounds that took place on July 11, August 8, September 12, and September 28, 2006.

The performance of the ERH treatability study was evaluated based on the collection and analyses of temperature, vapor, soil, and pore water data. These data indicated the effectiveness of the ERH system to the criteria set forth for the treatability study, specifically:

- The temperature goal of 90 degrees Celsius throughout the treatment volume was exceeded, with only a few exceptions that did not affect the overall system performance.

- Approximately 1,200 of 1,350 pounds (89 percent) of cVOC mass were removed in the vapor recovery stream; this meets the study goals of providing significant cVOC removal.

- The average total cVOC concentration in the soil samples were reduced to 4.1 mg/kg (99.1 percent reduction), exceeding the goal of 20 mg/kg (95.5 percent reduction). In fact, each individual soil sample exhibited a concentration of less than 16 mg/kg, less than the goal of 20 mg/kg for the average sample.

- Pore water cVOC concentrations inside the treatment area were reduced 99 percent, meeting the goal of groundwater concentration reduction.

Based on the reduction of soil and pore water concentrations achieved and the exclusion of the groundwater ingestion pathway, additional site monitoring is not required.

2.10.2.2 Component 2: LUCs

This component will include preparation and implementation of appropriate LUCs at the site, such as property, soil, and groundwater/pore water use restrictions. The future land use of the site will be industrial/commercial, most likely as a parking lot, and the property LUCs will prevent future residential development. The current asphalt cover and HDPE liner will continue to be utilized and maintained to prevent contact with site soil and will also prevent infiltration of rain water to the subsurface, reducing the recharge rate of groundwater, and inhibiting the off-site migration of remaining absorbed- and dissolved phase contamination. The LUCs will specify that the existing cap (asphalt parking lot and HDPE liner) be maintained to prevent access to the remaining soil contamination at the site and prevent groundwater ingestion. The LUCs will specify that prior to any other site use, the human health risks will be

recalculated and re-evaluated based on the potential future use and the Illinois EPA will be notified in accordance with the **LUC Memorandum of Agreement**.

Also, the LUCs will prohibit the installation of groundwater wells, other than for use as environmental monitoring wells. LUCs will be implemented to make sure that the restrictions on groundwater use and disturbance of soil established in the **LUC Memorandum of Agreement** are applied and enforceable at this site. Additionally, LUCs will require review of construction activities and intrusive work at the site to protect workers and confirm proper management of contaminated materials.

By separate Memorandum of Agreement dated September 1, 2002, with the Illinois EPA and Naval Station Great Lakes, on behalf of the Department of the Navy, agreed to implement base-wide, certain periodic Site inspection, condition certification, and agency notification procedures to ensure the maintenance by Naval Station Great Lakes personnel of any site-specific LUCs deemed necessary for present or future protection of human health and the environment. A fundamental premise underlying execution of this agreement was that through the Navy's substantial good-faith compliance with the procedures called for therein, reasonable assurances would be provided to the Illinois EPA as to the permanency of those remedies that included the use of specific LUCs.

It is understood that the terms and conditions of the Memorandum of Agreement are not specifically incorporated or made enforceable herein by reference. Should compliance with the Memorandum of Agreement not occur or should the Memorandum of Agreement be terminated, it is understood that the protectiveness of the remedy concurred to may be reconsidered and additional measures may need to be taken to adequately ensure necessary future protection of human health and the environment.

The LUCs will be developed and implemented by a LUC Implementation Plan that will identify the objectives, implementation, and enforcement of the LUCs. Annual site inspections will be conducted by the Navy to verify continued implementation of these LUCs.

Based on the information currently available, the Navy and Illinois EPA conclude that the selected remedy meets the threshold criteria and provides for the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. The Navy and Illinois EPA expect the selected remedy to satisfy the following statutory requirements of CERCLA Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost-effective; (4) utilize permanent solutions to the maximum extent practical; and (5) satisfy the preference for treatment as a principal element. The Navy and Illinois EPA also believe that the selected remedy meets the RCRA requirements

for closure of the RCRA storage unit at this site. Therefore, the following completed forms are included with this document (Appendix A):

- *Illinois EPA RCRA Corrective Action Certification*. This form certifies that the corrective action was completed in accordance with the requirements of the NS Great Lakes RCRA permit. This is certified by the owner/operator (NS Great Lakes), the licensed professional overseeing the activities (Robert Davis, PE, of TtNUS), and the analytical laboratory (Severn Trent Laboratories, Inc.).

- *RCRA Interim Status Closure Certification Form*. This form certifies that the hazardous waste management unit has been closed in accordance with a plan approved by Illinois EPA and must be attached to the report that demonstrates closure. This is certified by the owner/operator and the licensed professional overseeing the activities.

2.10.2.3 Expected Outcomes of the Selected Remedy

The expected outcome of the selected remedy for Site 22 will be protective of human health and the environment, and the site will be returned to its intended use. A significant reduction in the soil and pore water COC concentrations occurred during the Focused ERH Treatability Study in the treatment area. LUCs will be required to restrict property use, prevent groundwater use and disturbance of the soil, and to maintain the current capping system.

2.10.2.4 Cost of Selected Remedy

Based on modifications to the original Alternative 5, the net present worth of the selected remedy was reduced from $990,000 to $787,500. A breakdown of the costs associated with the selected remedy is presented below:

COMPONENT OF REMEDY	COST
CAPITAL COSTS	
Focused Electric Resistance Heating (ERH)	
Work Plans	$12,000
Field Activities	$690,000
Laboratory Analysis	$12,000
Reports	$25,000
Land Use Control Implementation	$21,000
TOTAL CAPITAL COST	**$760,000**

COMPONENT OF REMEDY	COST
CONTINUING COSTS	
Annual Site Inspections (30 years)	$1,000 per year
Five-Year Review Documents (30 years)	$7,000 per event (6 events)
NET PRESENT WORTH OF CONTINUING COSTS	**$27,500**
TOTAL NET PRESENT WORTH OF REMEDY	**$787,500**

Note: a discount rate of 7 percent was used to calculate the net present worth (NPW) of this alternative.

2.11 STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, the selected remedy must be protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants as a principal element and a bias against off-site disposal of untreated hazardous substances, pollutants, or contaminants. The following sections discuss how the selected remedy meets these statutory requirements.

2.11.1 Protection of Human Health and the Environment

The selected alternative provides protection of human health and the environment by reducing the cVOC concentrations at the site by more than 99 percent via focused ERH, significantly reducing human health risks (see Section 2.6.1), and by establishing LUCs to prevent future exposure to contaminated media.

2.11.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy, a modified version of Alternative 5, will comply with the chemical-, location-, and action-specific ARARs and TBC criteria as presented in Tables 2-8 through 2-10, respectively. In setting the PRGs for soil and pore water at this site, the applicable USEPA and Illinois EPA criteria were considered; the ERH treatment and LUCs established at the site ensure that these are met.

Action-specific criteria were met through proper handling of waste (transportation and disposal), a thorough health and safety program which meets Occupational Safety and Health Administration standards that was implemented during all field activities, and diligent tracking of vapor discharge and re-injection water concentrations to make sure that they remained within permit limits.

2.11.3 Other Criteria, Advisories, or Guidance to be Considered for this Remedial Action

In implementing the selected remedy, the Navy and Illinois EPA agreed to consider a number of non-binding criteria including the following:

- Cancer Slope Factors (Integrated Risk Information System). These chemical-specific TBC criteria provide guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.

- Reference Dose Factors (Integrated Risk Information System). These chemical-specific TBC criteria provide guidance values used to evaluate the potential noncarcinogenic hazard caused by exposure to contaminants.

- Illinois Risk Based Cleanup Objectives, Part 742 TACO. These chemical-specific TBC criteria provide guidance for developing cleanup levels that can be developed on a site-by-site basis.

These factors, along with the ARARs, formed a basis of setting the ERH treatment goals, which were met and exceeded, and in limiting the exposure to contaminated media through LUCs.

2.11.4 Cost-Effectiveness

The selected remedy is deemed to be cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: “A remedy shall be cost-effective if its costs are proportional to its overall effectiveness” [NCP§300.430(f)(1)(ii)(D)]. This was accomplished by evaluating the “overall effectiveness” of those alternatives that satisfied the threshold criteria (i.e., protective of human health and the environment and ARAR compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). The relationship of the overall effectiveness of this remedial alternative (greater than 99 percent reductions in cVOC concentrations via ERH and prevention of exposure to contaminated media via LUCs) was determined to be proportional to its costs, and hence this alternative represents a reasonable value achieved for the investment. The estimated NPW of the modified Alternative 5 is $787,500, using a discount rate of 7 percent.

2.11.5 Utilization of Permanent Solutions and Alternative Treatment Technologies

The Navy and Illinois EPA have determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at Site 22. Of those alternatives that protect human health and the environment and comply with ARARs, the Navy and Illinois EPA have determined that this selected remedy provides the best balance in terms of the five balancing criteria while also considering the statutory preference for treatment as a principle element and considering State and Community Acceptance. Treatment at this site reduced cVOC concentrations in the site soil and groundwater by more than 99 percent and permanently removed approximately 1,200 pounds of cVOCs from the subsurface.

2.11.6 Preference for Treatment as a Principle Element

The Focused ERH Treatability Study was implemented and achieved the objectives of Alternative 5 and is the most practical solution for Site 22. An estimated 1,200 pounds of cVOCs were removed from the treatment area through the vapor recovery system. This alternative satisfies the statutory preference for treatment as the principle element of the selected remedy.

2.11.7 Five-Year Review

Because the selected remedy results in some hazardous substances, pollutants, or contaminants remaining on site above the concentrations that allow for unlimited use and unrestricted exposure, a statutory Five-Year Review will be conducted by the Navy at Site 22 within 5 years of ROD signature to make sure the remedy is still protective of human health and the environment. The Five-Year Review process will continue until the hazardous substances, pollutants, or contaminants on site are no longer present at concentrations that do not allow for unlimited use and unrestricted exposure. The Five-Year Review process will continue until the hazardous substances, pollutants, or contaminants on site are no longer present at concentrations that do not allow for unlimited use and unrestricted exposure.

2.12 DOCUMENTATION OF SIGNIFICANT CHANGES

The **Proposed Plan for Site 22** was released for public review and comment on March 7, 2008 by the Navy and Illinois EPA. A **Public Notice** was published in the Great Lakes Bulletin on March 7, 2008 informing the public that the Proposed Plan was available for review at the Environmental Department at Naval Station Great Lakes, Building 1A, located on 201 Decatur Avenue, Great Lakes, Illinois. The Proposed Plan requested that comments be submitted by April 7, 2008. No public comments were

received; therefore, no changes to the preferred remedy, as originally identified in the Proposed Plan, were made.

TABLE 2-1

SUMMARY OF DESCRIPTIVE STATISTICS AND CRITERIA COMPARISONS FOR RI SURFACE SOIL DATA
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Range of Detects	Range of Nondetects	Sample with Maximum Concentration	Average of Positive Results	Average of All Results[1]	Illinois TACO for Soil Ingestion[2]	TACO for Soil Ingestion Exceedances[3]	Region 9 Residential PRG	Region 9 Residential PRG Exceedances[3]	USEPA Generic Soil to Groundwater SSL (DAF=1)	USEPA Generic Soil to Groundwater SSL (DAF=1) Exceedances[3]	Illinois TACO Soil to Groundwater Tier 1[2]	TACO Soil to Groundwater Tier 1 Exceedances[3]	Illinois TACO for Soil Inhalation[2]	TACO for Soil Inhalation Exceedances[3]	Illinois TACO for Soil Inhalation-Industrial[2]	TACO for Soil Inhalation-Industrial Exceedances[3]
Volatiles (ug/kg)																		
CIS-1,2-DICHLOROETHENE	2/10	490 J - 52,000	4.4 - 8,700	NTC22SS150001	26,245	5,724	780,000	0	43,000	1	20	2	400	2	1,200,000	0	1,200,000	0
TETRACHLOROETHENE	10/10	0.65 J - 770,000	NA	NTC22SS150001	101,183	101,183	12,000	3	1,500	6	2.9	7	60	6	11,000	3	20,000	3
TRICHLOROETHENE	2/10	730 J - 7,700 J	4.4 - 8,700	NTC22SS150001	4,215	1,318	58,000	0	53	2	2.8	2	60	2	5,000	1	8,900	0

1 - The average concentrations were calculated using one-half the detection limit for non-detects.
2 - Illinois EPA (October 2004).
3 - Number of samples that exceed criterion.
TACO - Illinois EPA Tiered Approach to Corrective Action Objectives.
J - Positive result is estimated as a result of a value less than the reporting limit or technical noncompliance.
Shaded chemical name indicates that the maximum chemical concentration exceeds the minimum criterion.
PRG = Preliminary Remediation Goal.
SSL = Soil Screening Level.
DAF = Dilution attenuation factor.

TABLE 2-2

SUMMARY OF DESCRIPTIVE STATISTICS AND CRITERIA COMPARISONS FOR RI SUBSURFACE SOIL DATA
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Parameter	Frequency of Detections	Range of Detects	Range of Nondetects	Sample with Maximum Concentration	Average of Positive Results	Average of All Results[1]	Illinois TACO for Soil Ingestion[2]	TACO for Soil Ingestion Exceedances[3]	Region 9 Residential PRG	Region 9 Residential PRG Exceedances[3]	USEPA Generic Soil to Groundwater SSL (DAF=1)	USEPA Generic Soil to Groundwater SSL (DAF=1) Exceedances[3]	TACO Soil to Groundwater Tier 1[2]	TACO Soil to Groundwater Tier 1 Exceedances[3]	Illinois TACO for Soil Inhalation[2]	Illinois TACO for Soil Inhalation Exceedances[3]	Illinois TACO for Soil Inhalation-Industrial[2]	Illinois TACO for Soil Inhalation-Industrial Exceedances[3]
Volatiles (ug/kg)																		
1,1,1-TRICHLOROETHANE	3/36	6.7 - 45 J	4.1 - 26,000	NTC22SB151112-D	21	694	NC	0	1,200,000	0	97	0	2,000	0	1,200,000	0	1,200,000	0
1,1,2-TRICHLOROETHANE	1/36	4.3 J	4.1 - 26,000	NTC22SB200911	4	852	310,000	0	730	0	0.91	1	20	0	1,800,000	0	1,800,000	0
1,1-DICHLOROETHANE	3/36	2 J - 51	4.1 - 26,000	NTC22SB200911	19	694	7,800,000	0	510,000	0	1,000	0	23,000	0	1,300,000	0	130,000	0
1,1-DICHLOROETHENE	3/36	2.9 J - 42 J	4.1 - 26,000	NTC22SB151112-D	20	694	700,000	0	120,000	0	2.9	2	60	0	1,500,000	0	300,000	0
CIS-1,2-DICHLOROETHENE	6/36	55 - 9,300 J	4.1 - 23,000	NTC22SB191920	4,459	762	780,000	0	43,000	0	20	6	400	4	1,200,000	0	1,200,000	0
TETRACHLOROETHENE	31/36	0.55 J - 870,000 J	2.8 - 4.8	NTC22SB060708	53,891	46,406	12,000	5	1,500	7	2.9	14	60	10	11,000	6	20,000	4
TRANS-1,2-DICHLOROETHENE	4/36	1.6 J - 89 J	4.1 - 26,000	NTC22SB151112-D	28	695	1,600,000	0	69,000	0	34	1	700	0	3,100,000	0	3,100,000	0
TRICHLOROETHENE	7/36	0.71 J - 7,300 J	4.1 - 23,000	NTC22SB060708	2,581	517	58,000	0	53	6	2.8	6	60	6	5,000	2	8,900	0
VINYL CHLORIDE	1/36	140 J	4.1 - 26,000	NTC22SB151112-D	140	696	460	0	79	1	0.67	1	10	1	280	0	1,100	0

1 - The average concentrations were calculated using one-half the detection limit for non-detects.
2 - Illinois EPA (October 2004).
3 - Number of samples that exceed criterion.
TACO - Illinois EPA Tiered Approach to Corrective Action Objectives.
J - Positive result is estimated as a result of a value less than the reporting limit or a technical noncompliance.
Shaded chemical name indicates that the maximum chemical concentration exceeds the minimum criterion.
PRG = Preliminary Remediation Goal.
SSL = Soil Screening Level.
DAF = Dilution attenuation factor.

TABLE 2-3

SUMMARY OF DESCRIPTIVE STATISTICS AND CRITERIA COMPARISONS FOR RI PORE WATER DATA
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Parameter	Frequency of Detection	Range of Detects	Range of Nondetects	Sample with Maximum Concentration	Average of Positive Results	Average of All Results[1]	Region 9 Tap Water PRG	Region 9 Tap Water PRG Exceedances[3]	Illinois TACO Groundwater Ingestion Tier 1[2]	TACO Groundwater Tier 1 Exceedances[3]	Federal MCL GW[4]	Fed MCL GW Exceedances [3]
Volatiles (ug/L)												
CHLOROMETHANE	1/14	0.21 J	1 - 2,000	NTC22GW10D	0.21	72	1.5	0	NC	0	NC	0
CIS-1,2-DICHLOROETHENE	1/14	2.6	1 - 2,000	NTC22GW10S	2.6	72	61	0	70	0	70	0
TETRACHLOROETHENE	6/14	0.24 J - 59,000	1 - 2.2	NTC22GW06S	9,846	4,220	0.66	4	5	3	5	3
TRICHLOROETHENE	1/14	1.3	1 - 2,000	NTC22GW10S	1.3	72	0.028	1	5	0	5	0

1 - The average concentrations were calculated using one-half the detection limit for non-detects.
2 - Illinois EPA (October 2004).
3 - Number of samples that exceed criterion.
4 - USEPA (Summer 2002).
TACO - Illinois EPA Tiered Approach to Corrective Action Objectives.
J - Positive result is estimated as a result of a value less than the reporting limit or a technical noncompliance.
NC - No criterion.
Shaded chemical name indicates that the maximum chemical concentration exceeds the minimum criterion.
PRG = Preliminary Remediation Goal.
MCL = Maximum Contaminant Level.

TABLE 2-4

SUMMARY OF DESCRIPTIVE STATISTICS AND CRITERIA COMPARISONS FOR POST-TREATABILITY STUDY SURFACE/SUBSURFACE SOIL DATA
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Parameter	Frequency of Detections	Range of Detects	Range of Nondetects	Sample with Maximum Concentration	Average of Positive Results	Average of All Results[1]	Illinois TACO for Soil Ingestion[2]	Illinois TACO for Soil Inhalation-Residential[2]	Illinois TACO for Soil Inhalation-Industrial[2]
Volatiles (ug/kg)									
1,1-DICHLOROETHENE	1/15	1.1 J - 1.1 J	4.6 - 700	NTC22SB150001	1.1	115	700000	1500000	1500000
VINYL CHLORIDE	1/15	0.48 J - 0.48 J	4.6 - 700	NTC22SB150001	0.48	115	460	280	1100
TRANS-1,2-DICHLOROETHENE	2/15	2.7 J - 8	4.6 - 700	NTC22SB150001	5.35	111	1600000	3100000	3100000
CIS-1,2-DICHLOROETHENE	6/15	2.5 J - 250	5.4 - 470	NTC22SB211314	123	116	780000	1200000	1200000
TRICHLOROETHENE	11/15	0.55 J - 4000	5.4 - 280	NTC22SB221819	470	370	58000	5000	8900
TETRACHLOROETHENE	13/15	3.5 J - 19000	4.6 - 5.4	GL95105S120001	4309	3735	12000	11000	20000
Miscellaneous Parameters									
PERCENT SOLIDS	15/15	79.3 - 89.7	--	NTC22SB191920	84.6	84.6	NA	NA	NA

The original and field duplicate samples are counted as one sample in the frequency of detections.
1 - The average concentrations were calculated by using one-half the detection limit for non-detects.
2 - Illinois EPA (May 2005).
Shaded chemical name indicates that the maximum chemical concentration exceeds the minimum criterion.
J - Positive result is estimated as a result of a value below the reporting limit or a technical noncompliance.

TABLE 2-5

SUMMARY OF DESCRIPTIVE STATISTICS AND CRITERIA COMPARISONS FOR POST-TREATABILITY STUDY PORE WATER DATA
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Parameter	Frequency of Detections	Range of Detects	Range of Nondetects	Sample with Maximum Concentration	Average of Positive Results	Average of All Results[(1)]	Region 9 Tap Water PRG	Illinois TACO Groundwater Ingestion Tier 1 [(2)]	Federal MCL GW[(3)]
Volatiles (ug/L)									
CHLOROMETHANE	1/3	0.38 J - 0.38 J	1 - 1	NTC22MW06SR	0.38	0.46	1.5	NC	NC
CIS-1,2-DICHLOROETHENE	3/3	0.21 J - 2.3	NA	NTC22MW06SR	1.27	1.27	61	70	70
TETRACHLOROETHENE	3/3	1.2 - 16	NA	NTC22MW10DR	8.8	8.8	0.66	5	5
TRICHLOROETHENE	2/3	1.2 - 5.2	1 - 1	NTC22MW06SR	3.2	2.3	0.028	5	5

1 - The average concentrations were calculated by using one-half the detection limit for non-detects.
2 - Illinois EPA (October 2004).
3 - USEPA (Summer 2002).
J - Positive result is estimated as a result of a value below the reporting limit or a technical noncompliance.
TACO - Illinois EPA Tiered Approach to Corrective Action Objectives.
NC - No criterion.
NA - Not applicable.
Shaded chemical name indicates that the maximum chemical concentration exceeds the minimum criterion.

TABLE 2-6

SUMMARY OF HUMAN HEALTH RISKS
SITE 22 - FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

RECEPTOR	PRE-TREATMENT CANCER RISKS			POST-TREATMENT CANCER RISKS		
	Surface Soil	Subsurface Soil	Groundwater	Surface Soil	Subsurface Soil	Groundwater
Construction Worker	$2x10^{-5}$	$4x10^{-6}$	$6x10^{-5}$	$2x10^{-7}$	$1x10^{-7}$	$2x10^{-8}$
Occupational Worker	$3x10^{-5}$	$1x10^{-5}$	$2x10^{-6}$	$1x10^{-6}$	$9x10^{-7}$	$1x10^{-7}$
Future Child Resident	$1x10^{-4}$	$3x10^{-5}$	$3x10^{-5}$	$2x10^{-6}$	$1x10^{-6}$	$1x10^{-7}$
Future Adult Resident	$1x10^{-4}$	$3x10^{-5}$	$5x10^{-5}$	$2x10^{-6}$	$1x10^{-6}$	$2x10^{-7}$
Future Resident (Child and Adult)	$2x10^{-4}$	$6x10^{-5}$	$8x10^{-5}$	$3x10^{-6}$	$2x10^{-6}$	$3x10^{-7}$

RECEPTOR	PRE-TREATMENT NONCANCER RISKS			POST-TREATMENT NONCANCER RISKS		
	Surface Soil	Subsurface Soil	Groundwater	Surface Soil	Subsurface Soil	Groundwater
Construction Worker	26	4	8	0.4	0.6	0.06
Occupational Worker	0.2	0.06	0.02	0.01	0.01	0.003
Future Child Resident	3	1	1	0.06	0.06	0.01
Future Adult Resident	1	0.2	0.5	0.01	0.02	0.004
Future Resident (Child and Adult)	NA	NA	NA	NA	NA	NA

NA - Not Applicable

TABLE 2-7

SUMMARY OF COMPARATIVE EVALUATION OF REMEDIAL ALTERNATIVES
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS
PAGE 1 OF 3

Evaluation Criteria	Alternative 1: No Action	Alternative 2: In-Situ Chemical Oxidation, Monitoring, and LUCs	Alternative 3: In-Situ ERH, Monitoring, and LUCs	Alternative 4: Excavation, Off-Base Treatment and Disposal, Monitoring, and LUCs	Alternative 5 (Modified): Focused ERH and LUCs
Overall Protection of Human Health and Environment	Would not be protective because existing asphalt pavement and HDPE liner would not be maintained and site development would be unrestricted. This could result in exposure to contaminated soil and pore water.	Protective due to substantial and permanent reductions of chlorinated VOCs. Considered less protective than Alternatives 3, 4, and 5 due to difficulties in delivering the reagent in the low permeability soil.	Protective due to substantial and permanent reductions of chlorinated VOCs. More protective than Alternatives 2 and 5.	Protective due to substantial and permanent reductions of chlorinated VOCs. More protective than Alternatives 2 and 5.	Slightly less protective than Alternatives 3 and 4 because less contamination is permanently removed. LUCs are relied upon to minimize exposure to and mobility of COCs in soil.
Compliance with ARARs and TBCs: Chemical-Specific Location-Specific Action-Specific	 Would not comply Would not comply Not applicable	 Would comply Would comply Would comply	 Would comply Would comply Would comply	 Would comply Would comply Would comply	 Would comply Would comply Would comply
Long-Term Effectiveness and Permanence	Would not be long-term effective or permanent because nothing would be done to reduce concentrations of soil COCs.	Would be long-term effective and permanent. Would use a well-proven and dependable technology. However, a pilot-scale treatability study would be required to verify site-specific effectiveness and design.	Would be slightly more long-term effective than Alternative 2 because in-situ ERH is typically better suited than in-situ chemical oxidation to treat low permeability soil. However, a pilot-scale treatability study would still be required.	Would be the most long-term effective and permanent because it includes slightly better proven and more dependable technologies.	More long-term effective than Alternative 2 because in-situ ERH is typically better suited than in-situ chemical oxidation to treat low permeability soil. However, the alternative may result in residual contamination remaining on the site.

TABLE 2-7

SUMMARY OF COMPARATIVE EVALUATION OF REMEDIAL ALTERNATIVES
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Evaluation Criteria	Alternative 1: No Action	Alternative 2: In-Situ Chemical Oxidation, Monitoring, and LUCs	Alternative 3: In-Situ ERH, Monitoring, and LUCs	Alternative 4: Excavation, Off-Base Treatment and Disposal, Monitoring, and LUCs	Alternative 5 (Modified): Focused ERH and LUCs
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment because no treatment would occur.	Would reduce toxicity, mobility and volume of COCs through in-situ chemical oxidation. An estimated 1,700 pounds of COCs would be irreversibly and permanently removed (if distribution is effective). No residuals would result from treatment.	Would reduce toxicity, mobility and volume of COCs through in-situ ERH. An estimated 1,700 pounds of COCs would be irreversibly and permanently removed. An estimated 8,000 pounds of spent GAC would result from treatment.	Would reduce toxicity, mobility and volume of COCs through off-base incineration and chemical oxidation. An estimated 1,700 pounds of COCs would be irreversibly and permanently removed. No residuals would result from treatment.	Would reduce toxicity, mobility, and volume of COCs through in-situ ERH and off-base incineration. An estimated 1,200 pounds of COCs would be irreversibly and permanently removed. Would also reduce mobility through maintaining the liner and asphalt cover via LUCs.
Short-Term Effectiveness	Would not result in short-term risks to remediation workers or adversely impact the surrounding community because no action would occur. Would not achieve RAOs or attain PRGs.	Would result in a slight possibility for short-term risk to remediation workers from exposure to contamination. This would be effectively controlled by compliance with health and safety procedures. Would not adversely impact the surrounding community or environment. Would achieve RAOs and PRGs within approximately 1 year.	Would result in similar possibility of short-term risk to remediation workers as Alternative 2 from exposure to contamination. This would be effectively controlled by compliance with health and safety procedures. Could also result in short-term risk to workers and adversely impact the surrounding community and environment because of exposure to contaminated vapors. This would be adequately mitigated through treatment. Would achieve RAOs and PRGs within approximately 1 year.	Would result in significant possibility of short-term risk to remediation workers from exposure to contamination. This would be effectively mitigated by engineering controls and compliance with health and safety procedures. Could result in short-term risk to workers and adversely impact the surrounding community from exposure to spillage or to incineration exhaust gases. This would be adequately mitigated by compliance with DOT regulations and by treatment of incineration off-gas. Would achieve the RAOs and PRGs within approximately 6 months.	Would result in the slight to moderate possibility of short-term risk to remediation workers and could adversely impact the surrounding community. The risks for this alternative will likely be less than Alternatives 3 and 4. The risks could be adequately mitigated through measures such as dust suppression, treatment of vapors, and appropriate PPE. Would achieve the RAOs and attain the PRGs within approximately 6 months.

TABLE 2-7

SUMMARY OF COMPARATIVE EVALUATION OF REMEDIAL ALTERNATIVES
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Evaluation Criteria	Alternative 1: No Action	Alternative 2: In-Situ Chemical Oxidation, Monitoring, and LUCs	Alternative 3: In-Situ ERH, Monitoring, and LUCs	Alternative 4: Excavation, Off-Base Treatment and Disposal, Monitoring, and LUCs	Alternative 5 (Modified): Focused ERH and LUCs
Implementability	Would be easiest to implement because no action would be undertaken.	May be difficult to implement. Although installation of the in-situ chemical injection system would be relatively simple, effective delivery and adequate distribution of the oxidation reagent into the low permeability soil would be difficult. Qualified contractors are available. No construction permit should be required, but DPT injection of chemicals might have to comply with the substantive requirements of the State's UIC program. In-situ treatment would not trigger RCRA permit requirements and Land Disposal Restrictions.	Would be slightly less difficult to implement than Alternative 2. Installation of an in-situ ERH system would be somewhat more complex, and O&M would be required; however, this alternative is better suited to the low permeability soil. Qualified contractors are available to provide the required services. A construction permit would be required. In-situ treatment would not trigger RCRA permit requirements and Land Disposal Restrictions. Manifesting might be required for off-base disposal of the spent GAC.	Would be the most difficult to implement. Excavation would require shoring and dewatering. On-site staging would be required to segregate excavated soil in accordance with off-base treatment requirements. On-site screening, size reduction, or removal of free water might also be required. Resources and equipment would be readily available for these tasks. Permitted off-base TSDFs are available for chemical oxidation, incineration, and landfilling of the excavated soil. A construction permit, RCRA permit requirements, Land Disposal Restrictions, and manifesting of the excavated soil would be required.	Would be slightly easier to implement than Alternative 3 because the ERH would be on a smaller scale. It would be easier to implement than Alternative 4 because no excavation is required. LUCs would be easily implementable.
Costs:					
Capital	$0	$1,326,000	$3,078,000	$9,340,000	$760,500
NPW of O&M	$0	$0	$0	$0	$ 27,500
NPW	$0	$1,326,000	$3,078,000	$9,340,000	$787,500

NOTES:

ARARs Applicable or relevant and appropriate requirements
COCs Chemicals of concern
DOT Department of Transportation
DPT Direct push technology
ERH Electrical resistance heating
GAC Granular activated carbon
HDPE High-Density Polyethelyene
LUCs Land Use Controls
NPW Net present worth
O&M Operation and maintenance
PPE Personnel Protective Equipment
PRGs Preliminary Remedial Goal
RAOs Remedial Action Objectives
TBCs To be considered criteria
TSDF Treatment storage and disposal facility
UIC Underground Injection Control
VOC Volatile Organic Compounds

TABLE 2-8

FEDERAL AND STATE CHEMICAL-SPECIFIC ARARs/MEDIA CLEANUP STANDARDS AND TBCs
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Chemical-Specific ARAR	Citation/Reference	ARAR Type	Rationale for Use at Site 22, Naval Station Great Lakes
FEDERAL			
Preliminary Remediation Goals (PRGs)	USEPA Region 9, 2004	To be considered criteria (TBC)	Benchmark values for assessing the need for soil, groundwater, and air remedial action/corrective measures.
Generic Soil Screening Levels (SSLs)	USEPA, 1996b	TBC	Benchmark values for assessing the need for soil remedial action/corrective measures. The SSLs assess the potential migration of chemicals from soil to air and from soil to groundwater.
Resource Conservation and Recovery Act (RCRA) Subtitle C – Hazardous Waste Identifications and Listing Regulations	40 CFR 261.20	Potentially applicable	Used to identify a material as a hazardous waste and thus determine the applicability and relevance of RCRA C Hazardous Waste Rules.
USEPA Health Advisories	USEPA, 1996a	TBC	Benchmark values for assessing the need for groundwater remedial action/corrective measures.
STATE			
Illinois EPA Tiered Approach to Corrective Action Objectives (TACO); residential soil remediation objectives	Illinois EPA, online, 2005	TBC	Benchmark values for assessing the need for soil, groundwater, and air remedial action/corrective measures. The remediation objectives assess ingestion of soil, inhalation of chemicals from soil, migration of chemicals from soil to groundwater, and ingestion of groundwater.

TABLE 2-9

FEDERAL AND STATE LOCATION-SPECIFIC ARARs/MEDIA CLEANUP STANDARDS AND TBCs
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Location-Specific ARAR	Citation/Reference	ARAR Type	Rationale for Use at Site 22, Naval Station Great Lakes
FEDERAL			
USEPA's Groundwater Protection Strategy	USEPA, 1984	To be considered criteria (TBC)	Surficial groundwater at Site 22 is likely designated Class IIIA.
STATE			
There are no State Location-Specific ARARs			

TABLE 2-10

FEDERAL AND STATE ACTION-SPECIFIC ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS
PAGE 1 OF 2

Action-Specific ARAR	Citation/Reference	ARAR Type	Rationale for Use at Site 22, Naval Station Great Lakes
FEDERAL			
Solid Waste Disposal Act/RCRA Subtitle C	42 United States Code (U..S.C.) 6905, 6912a, 6924-6925	See below	See below
• Standards for Hazardous Waste Generators	40 Code of Federal Regulations (CFR) 262	Potentially applicable	Applicable for removed site wastes determined to be hazardous.
• Standards for Hazardous Waste Transportation	40 CFR 263.10	Potentially applicable	Applicable for site wastes determined hazardous that are transported off site.
• Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities (TSDFs)	40 CFR 264, Subparts A, B, E, F, G, I, and S	Potentially applicable	Applicable to waste removed from the site, including both on-site and off-site management.
• Interim status standards for owners and operators of hazardous waste TSDFs	40 CFR 265, Subparts A, B, E, G, and I	Relevant and appropriate	Establishes design and operating criteria for hazardous landfills.
• RCRA Land Disposal Restrictions (LDR) Requirements	40 CFR 268.7	Potentially applicable	If off-site treatment or disposal of contaminated media and/or disposal of treatment residuals that may be considered hazardous waste is necessary, it would be subject to LDRs.
Clean Air Act National Ambient Air Quality Standards (NAAQSs)	42 U.S.C §7401- 7642, 40 CFR Part 50	Potentially applicable	Remedial action/corrective measures involving treatment of media could result in emissions to the atmosphere.
Department of Transportation (DOT) Hazardous Materials Transportation	49 CFR	Potentially applicable	Considered potentially applicable depending on whether wastes are shipped off site for laboratory analysis, treatment, or disposal.
Occupational Safety and Health Administration (OSHA) Standards	29 CFR 1910.120	Applicable	On-site activities are required to follow OSHA requirements.
Soil Conservation Act	U.S.C. 5901 et seq.	Applicable	During remedial activities, implementation of soil conservation practices would be required.
National Emission Standards for Hazardous Air Pollutants	40 CFR 61	Potentially applicable	Remedial activities that generate fugitive dust or incineration would require emission standards for designated hazardous pollutants.

TABLE 2-10

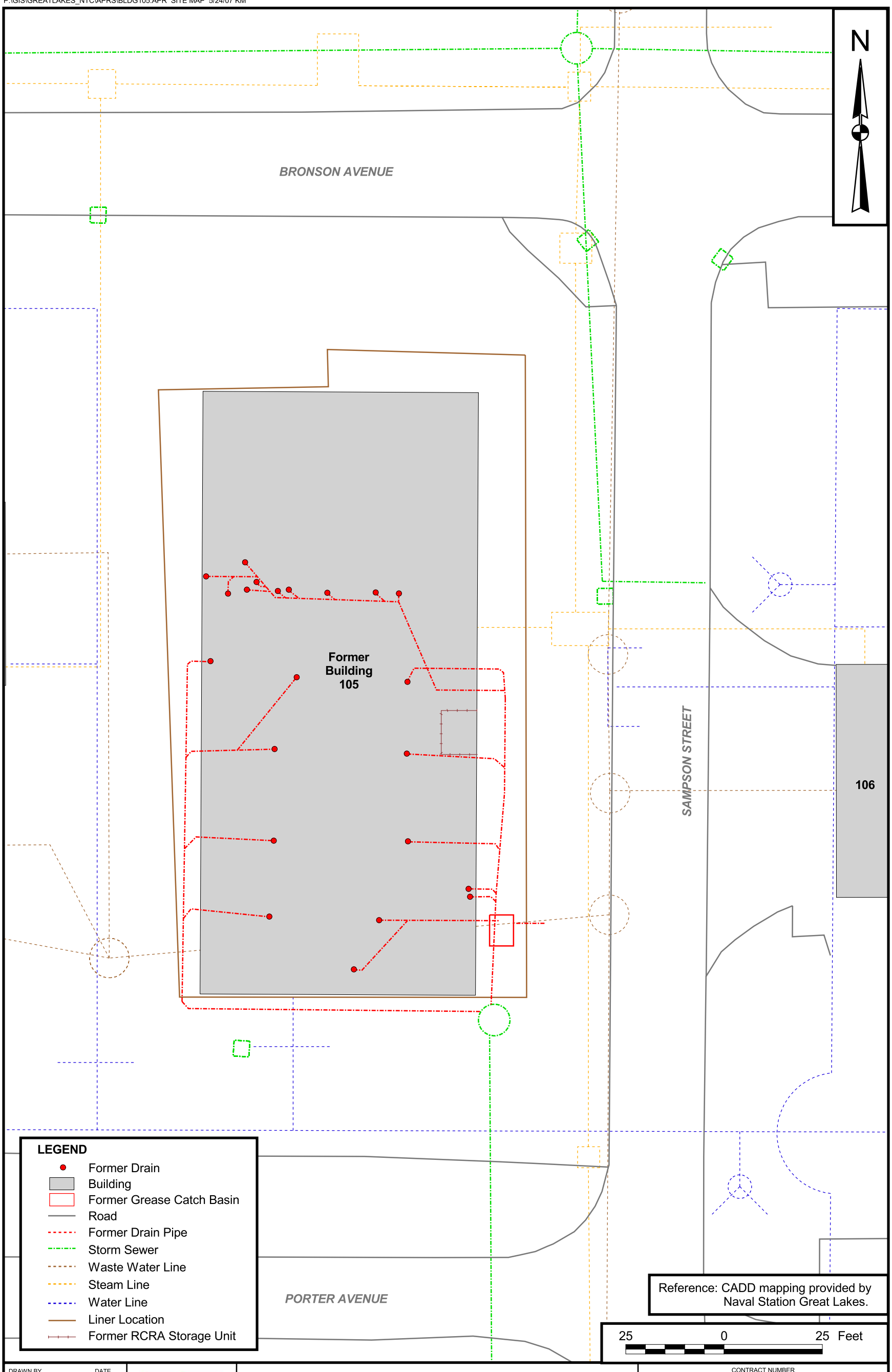
FEDERAL AND STATE ACTION-SPECIFIC ARARs/MEDIA CLEAN-UP STANDARDS AND TBCs
SITE 22 – FORMER BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES, ILLINOIS

Action-Specific ARAR	Citation/Reference	ARAR Type	Rationale for Use at Site 22, Naval Station Great Lakes
STATE			
Illinois Waste Disposal (Hazardous)	35 Illinois Administrative Code 721, 722, 723, 724, and 728	Potentially Applicable	Would apply if waste on site was deemed hazardous and needed to be stored, transported, or disposed of properly.
Illinois Solid Waste and Special Waste Hauling	35 Illinois Administrative Code 809	Applicable	Would apply if waste is transported to a disposal facility.
Illinois Emission Standards for Hazardous Air Pollutants	Illinois Administrative Code Title 35 Subtitle B, Chapter I	Potentially applicable	Remedial activities that generate fugitive dust or incineration would require emission standards for designated hazardous pollutants.
Illinois Environmental Protection Act	415 Illinois Compiled Statute 5/1, Titles II, III, V, and VI	Applicable	Include requirements for air pollution, water pollution, land pollution and refuse disposal, and noise pollution.
Illinois Groundwater Quality Regulations	35 Illinois Administrative Code 620	Applicable	Establish groundwater monitoring and reporting requirements as determined under the Permit Section of the Division of Land Pollution Control.

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR SITE LOCATION MAP 5/24/07 KM

DRAWN BY: K. PEILA	DATE: 12/2/03	SITE LOCATION MAP SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY NAVAL STATION GREAT LAKES, ILLINOIS	CONTRACT NUMBER: N00078
CHECKED BY: R. YOUNG	DATE: 5/25/05		APPROVED BY: RFD — DATE: 5/25/05
COST/SCHEDULE-AREA			APPROVED BY: — — DATE: —
SCALE: AS NOTED	NAVFAC		DRAWING NO.: FIGURE 2 - 1 — REV: 0

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR SITE MAP 5/24/07 KM



DRAWN BY	K. PEILA
DATE	8/17/05
CHECKED BY	RY
DATE	8/17/05
COST/SCHEDULE-AREA	
SCALE	AS NOTED

SITE MAP

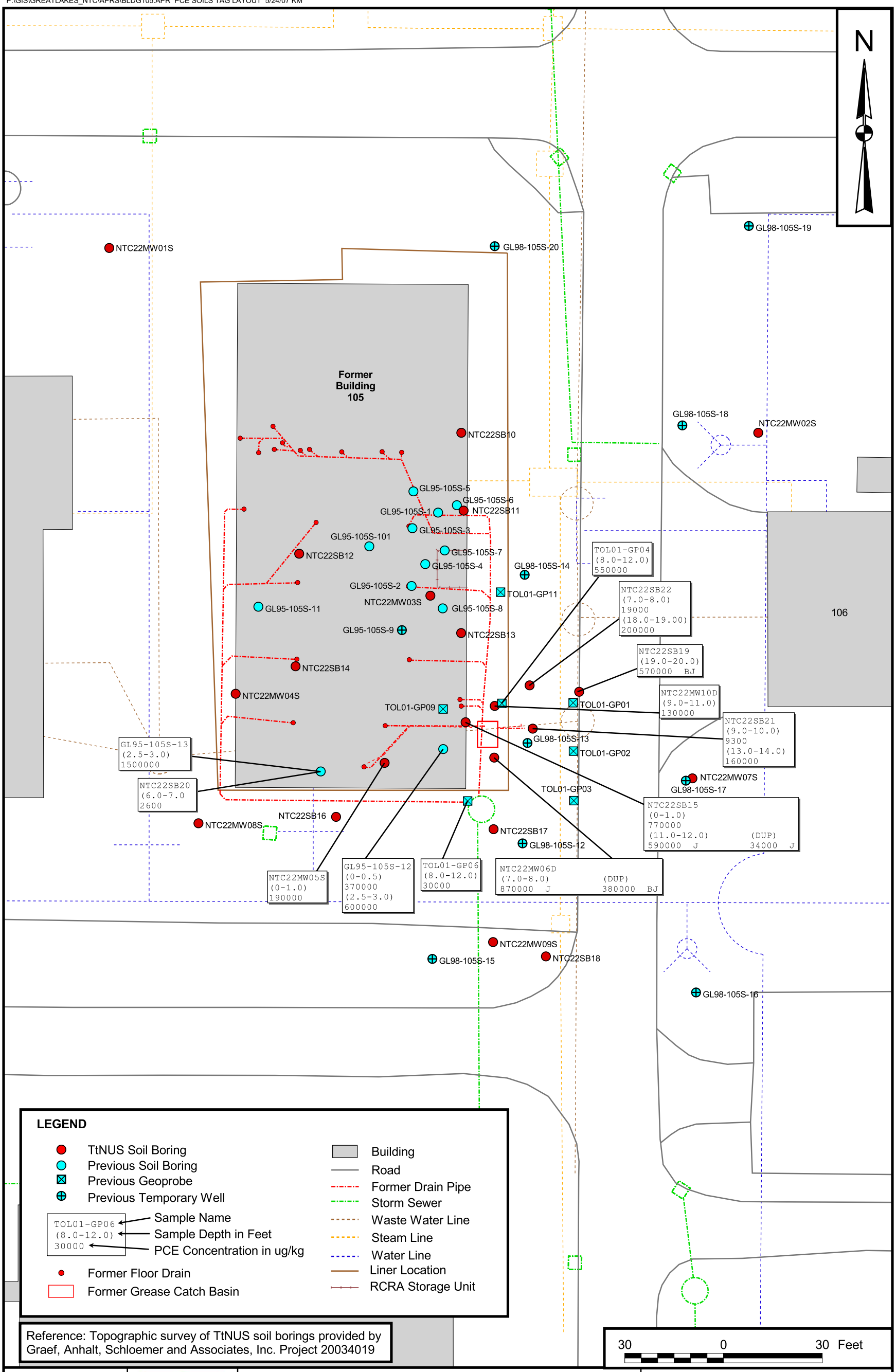
SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY

NAVAL STATION GREAT LAKES

GREAT LAKES, ILLINOIS

CONTRACT NUMBER	00078
APPROVED BY	RFD
DATE	8/17/05
APPROVED BY	—
DATE	—
DRAWING NO.	FIGURE 2-2
REV	0

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR PCE SOILS TAG LAYOUT 5/24/07 KM



Reference: Topographic survey of TtNUS soil borings provided by Graef, Anhalt, Schloemer and Associates, Inc. Project 20034019

DRAWN BY: C. SPEHAR	DATE: 10/13/05
CHECKED BY: C. PIKE	DATE: 1/4/06
COST/SCHEDULE-AREA	
SCALE: AS NOTED	

NAVFAC

BASELINE SOIL SAMPLE RESULTS FOR PCE

SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY

NAVAL STATION

GREAT LAKES, ILLINOIS

CONTRACT NUMBER: 00078	
APPROVED BY: RFD	DATE: 10/14/05
APPROVED BY: —	DATE: —
DRAWING NO.: FIGURE 2-3	REV: 0

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR ERH TREATMENT AREA LAYOUT 5/24/07 KM

N

Former Building 105

106

NTC22MW01S
GL98-105S-20
GL98-105S-19
GL98-105S-18
NTC22MW02S
NTC22SB10
GL95-105S-5
GL95-105S-6
GL95-105S-1
NTC22SB11
GL95-105S-3
GL95-105S-101
NTC22SB12
GL95-105S-7
GL95-105S-4
GL98-105S-14
GL95-105S-2
NTC22MW03S
TOL01-GP11
GL95-105S-11
GL95-105S-8
GL95-105S-9
NTC22SB13
NTC22SB14
TREATMENT DEPTH - 25'
NTC22SB22
NTC22SB19
NTC22MW04S
TOL01-GP04
TOL01-GP01
TOL01-GP09
NTC22MW10D
NTC22SB15
NTC22SB21
GL98-105S-13
GL95-105S-12
TOL01-GP02
NTC22MW05S
NTC22MW06D
GL95-105S-13
NTC22MW07S
GL98-105S-17
TREATMENT DEPTH - 8'
TREATMENT DEPTH - 18'
TOL01-GP06
TOL01-GP03
NTC22MW08S
NTC22SB16
NTC22SB17
GL98-105S-12
NTC22MW09S
GL98-105S-15
NTC22SB18
GL98-105S-16

LEGEND

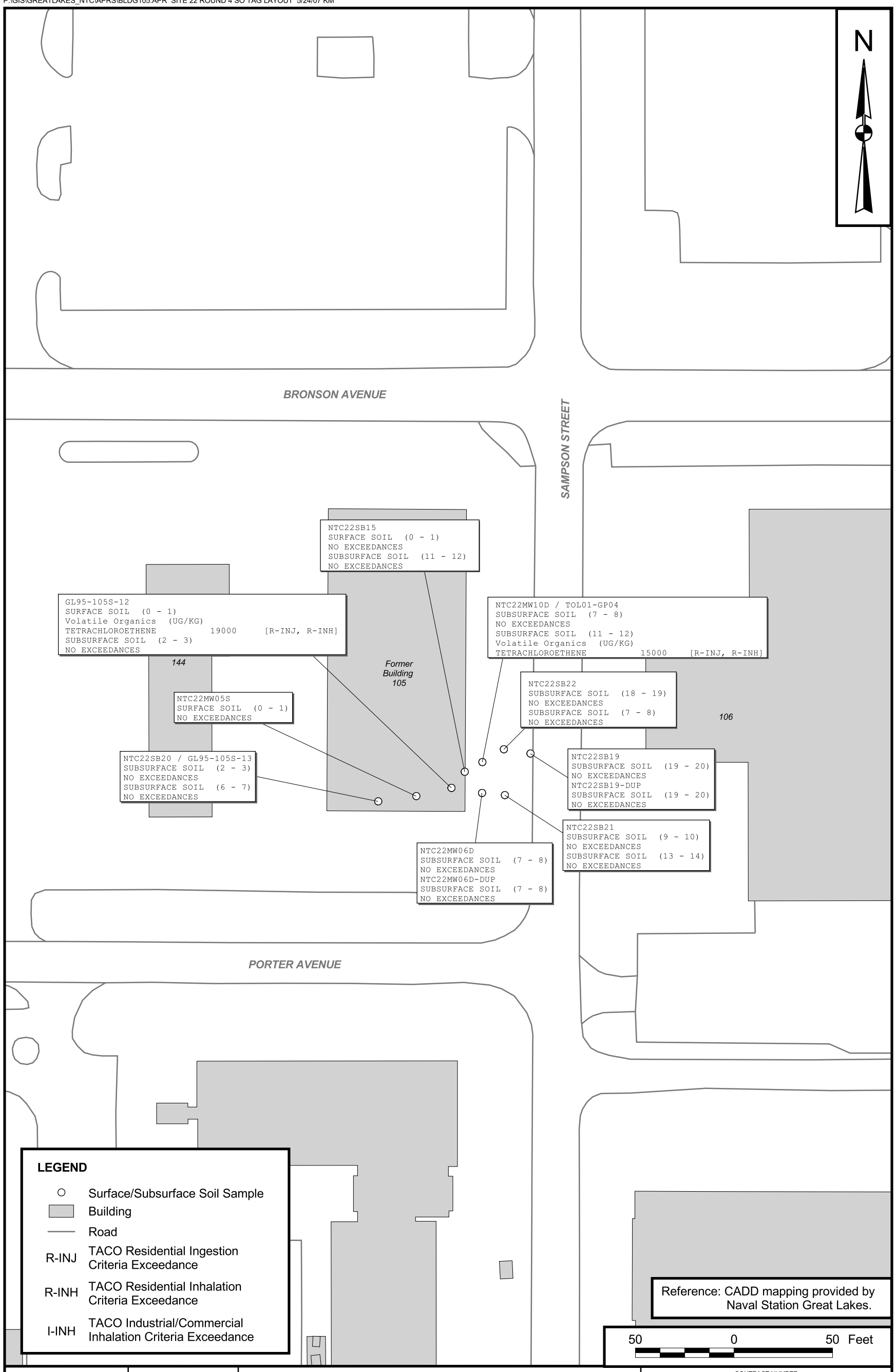
- TtNUS Soil Boring
- Previous Soil Boring
- Previous Geoprobe
- Previous Temporary Well
- TOL01-GP06 (8.0-12.0) 30000 — Sample Name / Sample Depth in Feet / PCE Concentration in ug/kg
- Treatment Depth - 8'
- Treatment Depth - 18'
- Treatment Depth - 25'
- Former Floor Drain
- Former Grease Catch Basin
- Building
- Road
- Former Drain Pipe
- Storm Sewer
- Waste Water Line
- Steam Line
- Water Line
- Liner Location
- RCRA Storage Unit

Reference: Topographic survey of TtNUS soil borings provided by Graef, Anhalt, Schloemer and Associates, Inc. Project 20034019

30 0 30 Feet

DRAWN BY: C. SPEHAR	DATE: 1/4/06	ERH TREATMENT AREA AND DEPTHS SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY NAVAL STATION GREAT LAKES, ILLINOIS	CONTRACT NUMBER: 00078
CHECKED BY: C. PIKE	DATE: 4/7/06		APPROVED BY: RFD — DATE: 4/7/06
COST/SCHEDULE-AREA			APPROVED BY: — — DATE: —
SCALE: AS NOTED	NAVFAC		DRAWING NO.: FIGURE 2 - 4 — REV: 0

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR SITE 22 ROUND 4 SO TAG LAYOUT 5/24/07 KM



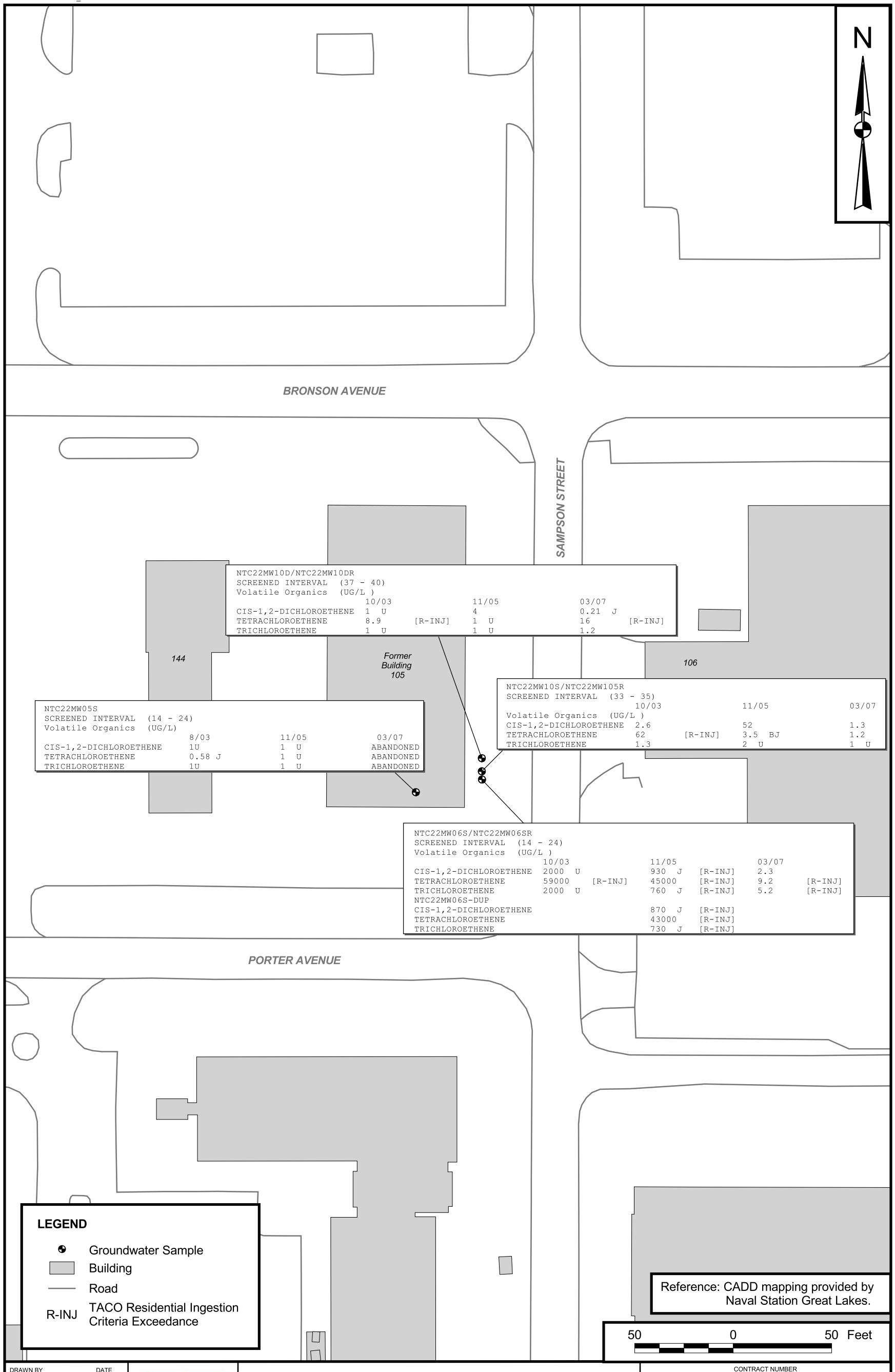
DRAWN BY	K. PEILA
DATE	8/17/05
REVISED BY	K. MOORE
DATE	5/1/07
CHECKED BY	C. PIKE
DATE	5/2/07
SCALE	AS NOTED

NAVFAC

POST-ERH TREATABILITY STUDY SAMPLE RESULTS
SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	00078
APPROVED BY	RFD
DATE	5/1/07
APPROVED BY	—
DATE	—
DRAWING NO.	FIGURE 2-5
REV	0

P:\GIS\GREATLAKES_NTC\APRS\BLDG105.APR SITE 22 GW TAG LAYOUT 5/24/07 KM



DRAWN BY	K. PEILA
DATE	8/17/05
REVISED BY	K. MOORE
DATE	5/2/07
CHECKED BY	C. PIKE
DATE	5/3/07
SCALE	AS NOTED

PORE WATER RESULTS
SITE 22 - BUILDING 105 OLD DRY CLEANING FACILITY
NAVAL STATION GREAT LAKES
GREAT LAKES, ILLINOIS

CONTRACT NUMBER	00078
APPROVED BY	RFD
DATE	5/1/07
APPROVED BY	—
DATE	—
DRAWING NO.	FIGURE 2-6
REV	0

FOCUSED IN-SITU ERH/ERH TREATABILITY STUDY AND LAND USE CONTROLS

FOCUSED IN-SITU ERH/ERH TREATABILITY STUDY

INSTALL AND OPERATE AN IN-SITU ERH SYSTEM CONSISTING OF THE FOLLOWING:

- 16 HEATING ELECTRODES AND VAPOR RECOVERY WELLS OVER A 2,400 FT^2 AREA AT DEPTHS RANGING FROM 8 TO 25 BGS
- 3 MULTI-LEVEL SOIL TEMPERATURE SENSORS
- ONE COMPUTER-CONTROLLED 2,000 kVA POWER-GENERATING UNIT
- ONE VAPOR TREATMENT SYSTEM CONSISTING OF ONE 110 CFM VACUUM PUMP, ONE CONDENSER, TWO 2,000-LB VAPOR-PHASE GAC ADSORPTION ADSORPTION UNITS

LAND USE CONTROLS

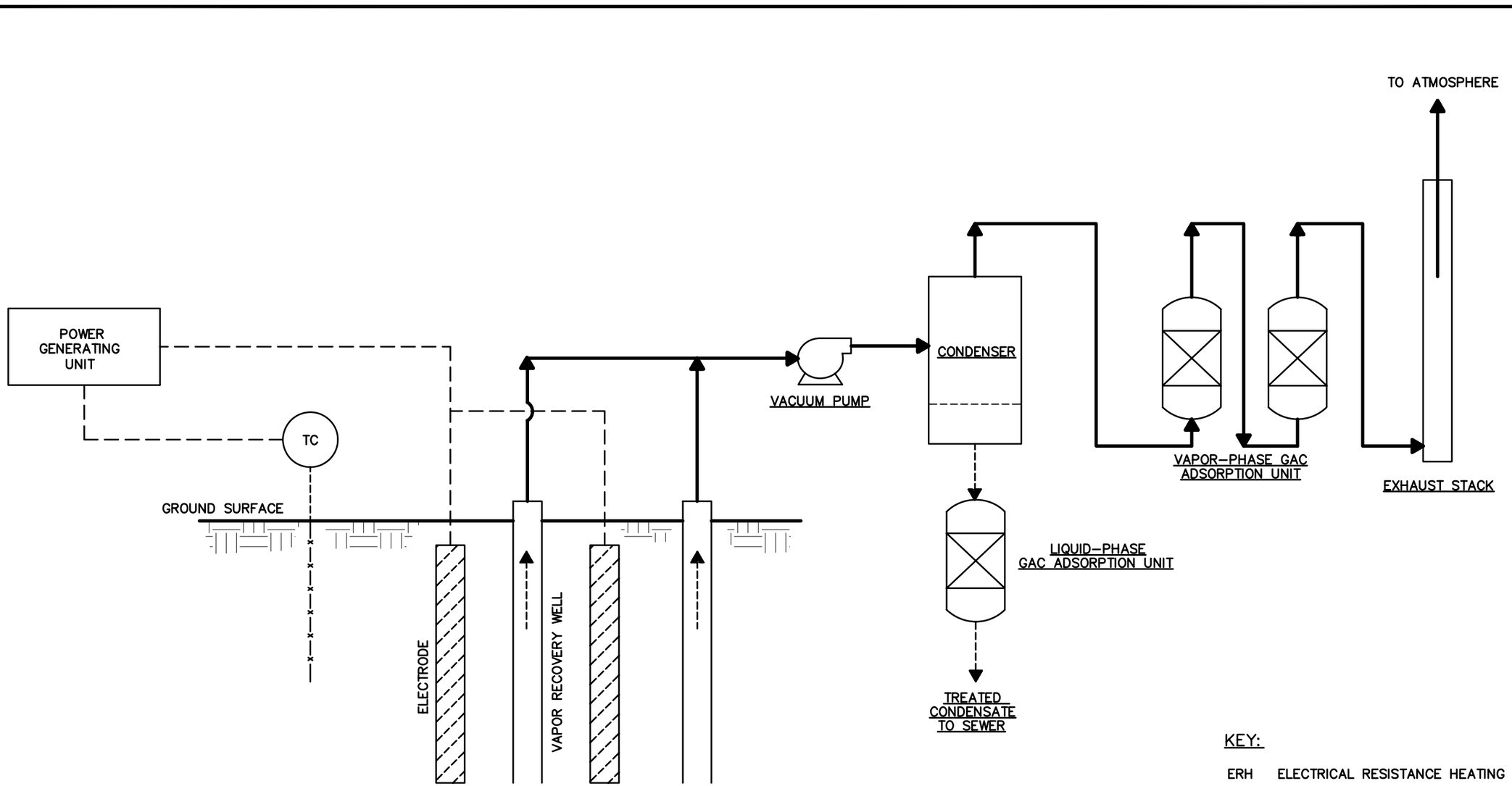
- ESTABLISH LUC IMPLEMENTATION PLAN IN LUC MOA
- RESTRICT GROUNDWATER USAGE AND DISTURBANCE OF SOIL
- PREVENT RESIDENTIAL DEVELOPMENT AND RESTRICT REUSE TO INDUSTRIAL/COMMERCIAL
- MAINTAIN ASPHALT COVER AND HDPE LINER
- PRIOR TO ANY OTHER SITE USE, RE-EVALUATE GROUNDWATER TO INDOOR AIR PATHWAY AND RE-EVALUATE RISKS USING POST-REMEDIATION SOIL AND GROUNDWATER CONCENTRATIONS
- REVIEW CONSTRUCTION ACTIVITIES/INTRUSIVE WORK TO ENSURE WORKERS SAFETY AND PROPER MANAGEMENT OF CONTAMINATED MATERIALS
- PERFORM REGULAR SITE INSPECTIONS

KEY:

BGS	BELOW GROUND SURFACE
CFM	CUBIC FEET PER MINUTE
ERH	ELECTRICAL RESISTANCE HEATING
FT^2	SQUARE FEET
GAC	GRANULAR ACTIVATED CARBON
kVA	KILOVOLT AMPERES
LB	POUND
VOCs	VOLATILE ORGANIC COMPOUNDS

DRAWN BY: MF DATE: 2/4/08	NAVFAC	BLOCK FLOW DIAGRAM MODIFIED VERSION OF ALTERNATIVE 5 SITE 22, RECORD OF DECISION NAVAL STATION GREAT LAKES, ILLINOIS	CONTRACT NO. 0202
CHECKED BY: DATE:			OWNER NO.
REVISED BY: DATE:			APPROVED BY: DATE:
SCALE: NONE			DRAWING NO. FIGURE 2-7 / REV. 0

ACAD: 0078PF01.dwg 05/29/07 MF PIT



KEY:

ERH	ELECTRICAL RESISTANCE HEATING
GAC	GRANULAR ACTIVATED CARBON
TC	TEMPERATURE CONTROL

DRAWN BY HJB	DATE 5/18/05	PROCESS FLOW DIAGRAM IN-SITU ERH SYSTEM SITE 22 FEASIBILITY STUDY NAVAL STATION GREAT LAKES, ILLINOIS	CONTRACT NO. 0078
CHECKED BY	DATE		OWNER NO. 0000
REVISED BY	DATE		APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-8 / REV. 0

NAVFAC

FORM CADD NO. SDIV-BH.DWG - REV 1 - 9/10/98

3.0 RESPONSIVENESS SUMMARY

The Proposed Plan for Site 22 was released for public comment on March 7, 2008. The Navy solicited input from the public during the public comment period of March 7 to April 7, 2008, to encourage public participation in the remedy selection process.

3.1 COMMUNITY PREFERENCES

No public comments were received during the public comment period; therefore, the Navy concludes that the community has accepted the plan. In a letter dated January 28, 2008, the Illinois EPA indicated their concurrence with the contents of the Proposed Plan.

Comments were received from the Illinois EPA on the draft version of this Record of Decision and incorporated herein.

3.2 INTEGRATION OF COMMENTS

The Navy concurs with the regulatory comments received and has incorporated these comments into this ROD.

3.3 COMMENT RESOLUTION

The Administrative Record for Naval Station Great Lakes contains a record of the Illinois EPA comments, and these comments have been incorporated into the ROD.

REFERENCES

Fetter, C. W., 1980. Applied Hydrogeology 2nd Edition, Merrill Publishing Company, A Bell & Howell Information Company, Columbus, Ohio.

Freeze, R. A., and Cherry, John A., 1979, "Groundwater", Prentice-Hall, Inc., Englewood Cliffs, NJ, 604 pp.

Illinois Environmental Protection Agency (Illinois EPA), October 2004. TACO (Tiered Approach to Corrective Action Objectives). Illinois Environmental Protection Agency, Bureau of Land, available at http://www.epa.state.il.us/land/taco/, accessed online, May 2005.

Naval Station Great Lakes, 2003a. Regional Shore Infrastructure Plan. August.

Naval Station Great Lakes, 2003b. Memorandum of Agreement between the Illinois Environmental Protection Agency, the U.S. Environmental Protection Agency, Region 5, and the U.S. Department of Navy. Ground Water Use Restrictions. September 30.

TtNUS (Tetra Tech NUS, Inc.), 2003. Quality Assurance Project Plan, Site 7 - RTC Silk Screening Shop, Site 17 - Pettibone Creek & Boat Basin, Remedial Investigation & Risk Assessment, Naval Training Center Great Lakes, Great Lakes Illinois, Updated for Site 22, June.

TtNUS, 2004. Remedial Investigation and Risk Assessment Report - Site 22 – Building 105 Old Dry Cleaning Facility, Naval Station Great Lakes, Great Lakes Illinois, July.

TtNUS, 2006. Feasibility Study Site 22 – Building 105 Old Dry Cleaning Facility, Naval Station Great Lakes, Great Lakes Illinois, January.

TtNUS, 2008a. Hot Spot Removal Electric Resistance Heating (ERH) Treatability Study Report, Site 22, Naval Station Great Lakes, Great Lakes Illinois, January.

TtNUS, 2008b. Proposed Plan Site 22 – Former Building 105 Old Dry Cleaning Facility, Naval Station Great Lakes, Great Lakes Illinois, January.

USEPA (United States Environmental Protection Agency), 1999. A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents, EPA 540/R-98/031, OSWER 9200.1-23P, July.

APPENDIX A

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CLOSURE FORMS

ILLINOIS EPA RCRA CORRECTIVE ACTION CERTIFICATION

This certification must accompany any document submitted to Illinois EPA in accordance with the corrective action requirements set forth in a facility's RCRA permit. The original and two copies of all documents submitted must be provided.

1.0 FACILITY IDENTIFICATION

Name: Naval Station Great Lakes

County: Lake

Street Address: Former Bldg 105, Sampson Street and Porter Ave

Site No. (IEPA): 0971255004

City: Great Lakes

Site No. (USEPA): IL7170024577

2.0 OWNER INFORMATION

Name: US Department of the Navy

Mailing Address: Code N45 @ 201 Decatur Avenue, Building 1A

Naval Station Great Lakes

Great Lakes, IL 60088-5600

Contact Name: Mark Schultz

Contact Title: Environmental Director

Phone No.: 847-688-2600 Ext 362

3.0 OPERATOR INFORMATION

Same as Owner

4.0 TYPE OF SUBMISSION (check applicable item and provide requested information, as applicable)

☐ RFI Phase I Workplan/Report
☐ RFI Phase II Workplan/Report
☐ CMP Report; Phase _____
☒ Other (describe):
ERH Treatability Study Report
Date of Submittal June 2007

IEPA Permit Log No. C-689
Date of Last IEPA Letter on Project Aril 9, 2003
Log No. of Last IEPA Letter on Project C-689-M-8
Does this submittal include groundwater information: ☒ Yes ☐ No

5.0 DESCRIPTION OF SUBMITTAL: (briefly describe what is being submitted and its purpose)

The results of the ERH treatability study were submitted. With the remediation accomplished during the study, the document states that the hazardous waste unit should be closed in accordance with a plan approved by the Illinois EPA.

6.0 DOCUMENTS SUBMITTED (identify all documents in submittal, including cover letter; give dates of all documents)

Th submittal includes Electric Resistance Heating (ERH) Treatability Study Report for Site 22 Former Building 105 Old Dry Cleaning Facility (June 2007) and the Record of Decision for Site 22 Former Building 105 Old Dry Cleaning Facility (February 2008)

7.0 CERTIFICATION STATEMENT - ***(This statement is part of the overall certification being provided by the owner/operator, professional and laboratory in Items 7.1, 7.2 and 7.3 below)***. The activities described in the subject submittals have been carried out in accordance with procedures approved by Illinois EPA. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

7.1 **OWNER/OPERATOR CERTIFICATION** (Must be completed for all submittals. Certification and signature requirements are set forth in 35 IAC 702.126.) All submittals pertaining to the corrective action requirements set forth in a RCRA Permit must be signed by the person designated below (or by a duly authorized representative of that person):

1. For a Corporation, by a principal executive officer of at least the level of vice-president.
2. For a Partnership or Sole Proprietorship, by a general partner or the proprietor, respectively.
3. For a Governmental Entity, by either a principal executive officer or a ranking elected official.

A person is a duly authorized representative only if:

1. the authorization is made in writing by a person described above; and
2. the written authorization is provided with this submittal (a copy of a previously submitted authorization can be used).

Owner Signature: Mark R. Schultz 8/5/08 (Date)

Title: Environmental Director

Operator Signature: _____ _____ (Date)

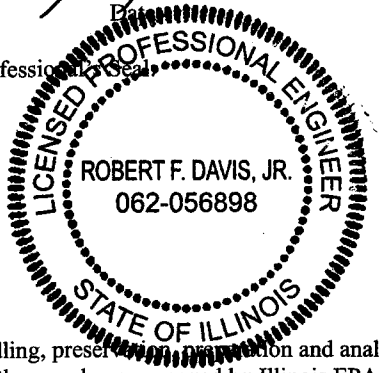
Title: _____

7.2 **PROFESSIONAL CERTIFICATION** *(if necessary)* - Work carried out in this submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. No one is relieved from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Professional's Signature: _____ 5/30/08 Date

Professional's Name: Robert F. Davis, PE

Professional's Seal:



Professional's Address: Tetra Tech NUS, Inc.
661 Andersen Road
Pittsburgh, PA 15220

Professional's Phone No.: 412-921-7251

7.3 **LABORATORY CERTIFICATION** *(if necessary)* - The sample collection, handling, preservation, preparation and analysis efforts for which this laboratory was responsible were carried out in accordance with procedures approved by Illinois EPA.

Name of Laboratory _____

_____
Signature of Laboratory Responsible Officer — Date

Mailing Address of Laboratory

_____
Name and Title of Laboratory Responsible Officer

_____

_____

_____

RCRA Interim Status Closure Certification Statement

To meet the requirements of 35 Ill. Adm. Code 725.215, this statement is to be completed by a responsible officer of the owner/operator (as defined in 35 Ill. Adm. Code 702.126) and an independent licensed professional engineer upon completion of interim status closure of a hazardous waste management unit.

Facility Name: Naval Station Great Lakes

Illinois EPA Identification Number: 0971255004

USEPA Identification Number: IL7170024577

Illinois EPA Closure Log No.: C-689

Name of Unit(s) Being Closed: Site 22, Former Building 105 Old Dry Cleaning Facility

The hazardous waste management unit(s) identified above has/have been closed in accordance with the specifications in a plan approved with conditions and modifications by Illinois EPA. A report demonstrating closure was carried out in accordance with the approved plan is attached.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Mark R. Schultz 8/5/08

Signature of Owner/Operator Responsible Officer — Date

Mark Schultz Environmental Director

Name and Title of Owner/Operator

Robert F. Davis 5/30/08

Signature of Licensed P.E. — Date

Robert F. Davis 062.056898

Name of Licensed P.E. and Ill. License No.

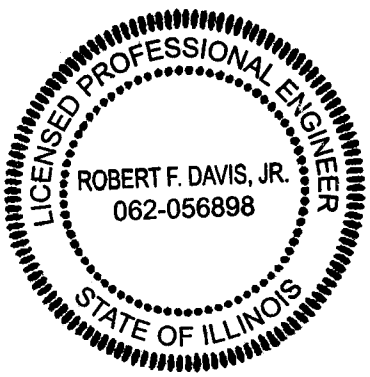
Mailing Address of P.E.:

Robert F. Davis, PE

Tetra Tech NUS, Inc., 661 Andersen Drive

Pittsburgh, PA 15220

Licensed P.E.'s Seal:



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